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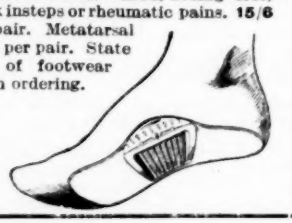

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A Contribution
TO THE STUDY OF THE
TREATMENT OF EPITHELIOMA OF THE TONGUE BY RADIUM.

Being a Hunterian Lecture delivered before the Royal College of Surgeons of England on Jan. 29th, 1930,

BY G. E. GASK, C.M.G., D.S.O., F.R.C.S. ENG.,
PROFESSOR OF SURGERY IN THE UNIVERSITY OF LONDON.

IN presenting this study I wish to say that it is really a contribution from the members of the Surgical Unit of St. Bartholomew's Hospital, of which I am the mouthpiece. We feel that the time has come to consider, more in detail than was previously possible, the relative value of treatment of carcinoma of the tongue by the old-established method of surgical excision and the new, much hoped for, rather spectacular, and not yet fully established treatment by radium. The amount of information at our disposal is still too small to arrive at definite conclusions, but it is important to consider what there is, seeing that in a short time the amount of radium in the country will be considerably increased. Following the Thanksgiving Fund for His Majesty's recovery and the foundation of the Radium Commission, a number of national radium centres are about to be started in the University medical teaching centres of England, Scotland, and Wales, so that in a short time we may expect a great stimulus to the radium treatment of patients suffering from cancer, and among these there are sure to be many suffering from cancer of the tongue. It seems to us, therefore, an opportune moment to take stock of the knowledge which is now available, to table the results obtained by surgery, and to scrutinise with care and without fear or favour the results and methods of radium treatment.

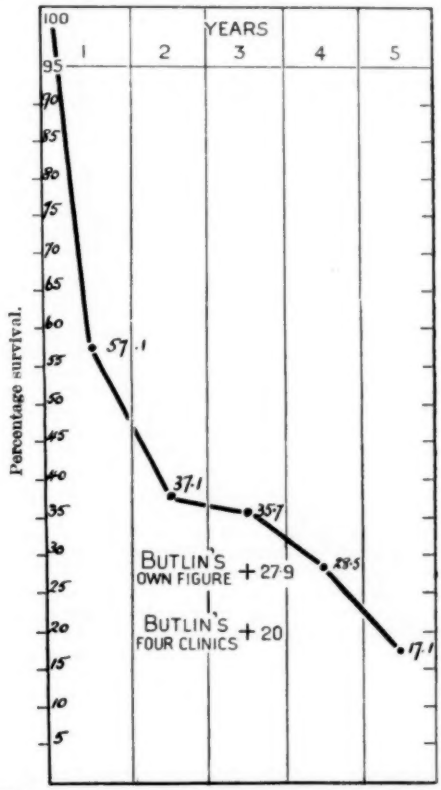
RESULTS OF SURGERY.

We have tried first to reach the approximate figure of the cures of cancer of the tongue obtained by surgery, so as to have a fixed point for comparison between surgery and radium therapy. Operations for removal of the tongue have been performed by surgeons now for many years, and we ought to be able to give accurate detailed figures for the results of surgery in all the different phases of the disease. Unfortunately, the medical profession has appeared unbusinesslike in the matter of compiling statistics, and slow in adopting follow-up schemes, with the result that it is difficult to find a large number of conclusive figures. Statistics are cold, heartless, things, which do not recommend themselves to optimists, but it is necessary to inflict some of them on you.

Statistics of St. Bartholomew's Hospital.

In 1922 a follow-up department was started at this hospital for the purpose of tracing the end-results of all patients suffering from cancer of the tongue. The results are shown on the accompanying graph. Included in this series are all those patients who were deemed operable, and were, in fact, operated on in one way or another by the various surgeons attached to the hospital. The results of the varying types of operations are not differentiated, as it was thought that the figures wanted were those that showed the value of surgery as a whole. Three years is not a long enough period to judge of any form of treatment of cancer, so only those patients have been included in this review who might have survived five years from the date of their original operation. Of these there were 70, of which only 12 remained alive and well and free from recurrence at the end of five years from the date of their operation. That is to say, there was a survival-rate of 17·1 per cent. (It is interesting to note in passing that if the period of observation had been continued for longer than five years the percentage of so-called "cures" would be still further diminished, for of the patients noted above as remaining well for five years three showed recurrences at the close of six years, and two at the end of seven years.)

Mr. R. F. Phillips, Luther Holden Scholar, who is now working on the end-results of patients suffering from buccal carcinoma (including carcinoma of tongue, floor of mouth, cheek, lip, tonsils, and palate), has supplied the following interesting figures which may later throw some light on the problem being studied. He holds that buccal carcinomata show degrees or grades of malignancy, which may be



Epithelioma of tongue. Five-year survival-rate of 70 patients operated on at St. Bartholomew's Hospital.

measured and foretold by their histology. Following Broders's[1] work, Mr. Phillips has examined the histology of the tumours from a large number of patients who have been treated at St. Bartholomew's Hospital between the years 1924 to 1927. These are divided into four grades, according as they show cells approaching the normal tissues or differing greatly from the normal and approaching the embryonic type. Thus, Grade 1 contains those cases which show much cell-nest formation and few mitoses, and Grade 4 those cases which show no cell-nest formation and much mitosis: whereas Grades 2 and 3 are intermediate.

The 159 patients observed fell into the following grades:—

	Cases and Percentage.			
Grade 1	21	(13·2)	Grade 3	50 (31·4)
„ 2	73	(45·9)	„ 4	15 (9·4)

[1] Broders, A. C.: Grading of Carcinoma and Practical Application, Minn. Med., 1925, viii., 736; and Epithelioma of Cavities and Internal Organs of Head and Neck, Arch. Surg., Chicago, 1925, xi., 1.

Thus, it will be seen that the largest number falls into Grade 2 and the smallest into Grade 4, the most malignant category. Mr. Phillips next worked out what happened to the patients in these various grades and tabled the survival-rate in each. He believes that the prognosis or chance of survival is definitely related to the type of growth. Thus, he finds that the survival-rate in

Per cent.
Grade 1 is 36·4
" 2 is 18·2
" 3 is 8·0
" 4 is 0 (all dead).
at the end of three years.

Number of patients followed, 90.

It should be interesting to find out whether any of these grades are more or less susceptible or sensitive to radium. There is some evidence to support the view that the cases falling into the first group—namely, those showing marked cell-nest formation with little mitosis, are less sensitive to radium than those highly malignant types in Group 4. More work is required, however, before this can be stated as proved.

Selection from Published Sources.

The results of surgery obtained by us at St. Bartholomew's Hospital are so bad that it seems only right to compare them with a selection taken from the published sources. Naturally, one's mind turns first to the publications of Sir Henry Butlin,[2] a Past-President of this College, who had the highest reputation for his work on cancer of the tongue.

Butlin gave a list of 197 cases of carcinoma of the tongue, which comprised all those operated on by him, the first of which was in 1881 and the last in 1908. Of these 197 patients, 55 lived for three years or over without recurrence—that is, he had a survival-rate of 27·9 per cent. at the end of the three-year period. The recent St. Bartholomew's Hospital figure at the end of three years is 35·7 per cent., so that there is not much difference between the two.

Butlin also quoted the combined figures of his own and three other clinics—namely, those of Whitehead, Krönlein, and Kocher. The combined figures of these four clinics showed a survival-rate of 20 per cent. at the end of the three-year period.

The survival-rates given by a number of other authors are: 18 per cent. by Capetti; 26·6 per cent. by Caird; and 14·3 per cent. by Cobb and Simmonds.[3]

The Mayo Clinic figures for the years 1910 to 1922 show a survival-rate of:—

30·8 per cent. at the end of 3 years.
24·4 " " 5 "
4·25 " " 10 "

A general survey of these figures, showing the results of operations for cancer of the tongue taken from clinics in various parts of the world, leads us to the conclusion that the best we can expect from surgery is a survival-rate of from 20 per cent. to 25 per cent. This is the basis on which the results of radium treatment can be compared.

RESULTS OF RADIUM.

At this point it is appropriate to turn back again to consider an almost prophetic utterance made by Sir Henry Butlin[4] 21 years ago, shortly before his death.

"At this moment, it would scarcely be too much to say that the air is charged with the emanations of radium. We are told that epithelioma of the tongue can be cured by radium. Had I been asked my opinion on this question a month ago, I should have said that, although two or three people in different parts of the world have claimed this power for radium, the general belief is that rodent ulcer is the only variety of malignant disease which radium is competent to cure. And I should have added that the only case of epithelioma of the mouth in my own practice to which radium had been applied (by the most skilful man with the best material) had ended disastrously. But I have, within the last few days, seen a case in which a typical epithelioma of the inside of the cheek is so much better, under the application of radium, at the end of four months, that it looks as if it would be quite cured. And this had apparently been accomplished without inflammation or sloughing or profound ulceration of the disease. I understand that the radium in this case was applied by means of the disc. As this epithelioma was about 1¼ inches in diameter and ulcerated all over, when I saw it four months ago, there seems no reason to doubt that small epitheliomata of the tongue may be removed by radium, probably with a better scar than would be left by any other efficient agent. But, having said this, it must not be forgotten that the removal of the primary disease is only part of the cure of epithelioma. Even the smallest, the youngest, and apparently the most insignificant epithelioma of the tongue is capable of affecting the lymphatic glands, as the cases I have related show. So that, unless radium is discovered to possess a far-reaching influence, spreading from the seat of the primary disease to the associated lymphatic glands, I am afraid that the surgeon must still occupy an important place in the treatment of epithelioma of the tongue."

Is not this a very remarkable forecast? It is humbling to realise that 21 years have passed since it was made, and that progress has been so lamentably slow. What one would like to be able to do now is to state the results of the treatment of epithelioma of the tongue by radium and to compare them with those obtained by surgery. At the present time these figures are too few and too recent to be of any great value, though it is greatly to be hoped that in a few years adequate and reliable figures will be available. The Radium Commission has adopted the policy of asking all the national radium centres which are being started to keep their records on uniform case sheets. These records in due course are to be collected and analysed, so that in the near future we may expect to have at our disposal a very large number of figures which should prove of great value.

There are, however, a few figures which have been published which are worth looking at. G. E. Birkett,[5] of the Manchester Radium Institute, who has done splendid pioneer work with radium, states:—

"There are no five-year figures available in this country, but continental workers report about 45 per cent. of five-year cures as regards the primary site, and 20 per cent. of absolute cures."

I gather that the figure of complete cures over a three-year period from the Manchester Radium Institute is 22–50 per cent. This result is not incomparably better than that obtained by surgery.

Roux-Berger and Monod,[6] from the Radium Institute of Paris, report that during the six years 1920 to 1925, inclusive, they treated 287 cases of epithelioma of the tongue, out of which number 77 were cured. By "cured," they say they mean those patients who were free from disease on Feb. 1st, 1927. This gives a percentage of cures of 26·8, or if a three-year period is taken on a total of 120 cases, 21·6 per cent. This is not as high a percentage of cures as one might have hoped for, and again does not appear to be much better than the results of surgery.

Radiumhemmet in Stockholm reports that, from a list of patients treated during the years 1921 to 1926 (inclusive), 14 are alive and well out of 46 treated; a survival-rate of 30·4 per cent. This again seems to be no better result than that obtained by surgery. At the same time they report a 78·3 per cent. survival-

[2] On the Results of Operations for Carcinoma of the Tongue. By Henry T. Butlin. Prepared for the Meeting of the International Society of Surgeons at Brussels, Sept., 1909. London: Adlard and Sons, 1908.

[3] Cancer of the Mouth: Results of Treatment by Operation and Radiation. By Channing Simmonds, Surg., Gyn., and Obstet., 1926, xliii.; Carcinoma of Tongue, Judd and New, Surg., Gyn., and Obstet., 1923, xxxvi., i.

[4] On the Early Diagnosis of Cancer of the Tongue and on the Results of Operations in such Cases. By Henry T. Butlin, Brit. Med. Jour., 1909, i.

[5] Radium Treatment of Buccal Carcinoma, Brit. Jour. of Surg., Jan., 1930; see also Amer. Jour. of Physical Therapy, 1928, v.

[6] Radiophysiologie et Radiotherapie. By Regaud. Vol. i., fasc. ii., Paris, 1928.

rate of cases of epithelioma of the lip at the end of two years.

It is admitted that these figures are few in number and recent, but it looks as if the final results are not startlingly better than those obtained by surgery. There are, however, some qualifying remarks to be made a little later.

A Survey of the Work of the Surgical Unit, 1928–29.

We now present to you a detailed account of those patients treated in the Surgical Unit during the years 1928 and 1929. The number is not great, but a careful study of even a small number of patients cannot fail to be of value, and certain deductions can be drawn.

The method of treatment of the primary growth of the tongue has been by radon seeds, of a strength varying from 1·5 mc. to 3 mc. The seeds were encased in platinum capsules of a thickness of 0·3 mm., increased later to 0·5 mm., so as to minimise burning. On an average the seeds were left in for seven days. The reason why radon seeds were used and not radium needles was, in the first instance, merely one of convenience. Seeds were available at a time when suitable needles were not, and further it appeared to us that seeds were more adaptable than needles for placing in the folds and crannies of the mouth. We hold no brief for radon as opposed to radium, but we only want to find out the truth. There seems to be an impression that the emanation is not as effective as the element on account of the rapid disintegration of radon. Physicists say that there ought to be no difference between the action of radon and radium, provided that a suitable dose be given. Our own observations tend to bear this out.

The glands in the neck have been treated in the main by a barrage of radium needles, inserted at the same time as the seeds in the tongue and arranged according to the accompanying diagram. Needles containing radium element were used in this instance as it was desired to irradiate large areas of tissue containing lymphatic glands. The needles were inserted by puncture and, as far as we know, no damage was done to any of the structures in the neck. The advisability of using needles for treating the glands of the neck, or of dissecting the glands, or of combining surgery with radium treatment, will be discussed later.

Deductions Drawn from an Analysis of 30 Cases.

There are certain points arising out of a close study of these figures which are worthy of comment. In the majority of cases the tongue has been materially affected by the action of the radon seeds; in the majority the original primary tumour or ulcer has disappeared entirely in the course of a few weeks and the tongue has been left a mobile useful organ.

In one instance (Case 10) the carcinoma was, as far as we could see, entirely unaffected by the action of radon seeds, and later the tongue was excised. The reason why this epithelioma did not react to the rays is unknown to us. Perhaps it was non-sensitive to radiations. Histologically it fell into Group 1 classification, that is to say, it showed well-marked cell-nest formation. Perhaps the seeds were below strength; perhaps they were not placed accurately. In another instance (Case 25), a woman with an easily accessible ulcer close to the tip of the tongue, the carcinoma was not materially influenced by the action of the radon seeds and her tongue has been excised. The histological findings show that she also falls into the Grade 1 classification. Perhaps these cases might be used as an argument for the use of the element rather than the emanation.

The question of the non-radio-sensitivity of some tumours is very puzzling and requires investigation. It emphasises the fact that we are still very much in the dark about the whole problem, and that our treatment is still empiric. There were six other patients in whom the tongue was not healed by the treatment. These may be accounted for in the main by the fact that the growths were extensive and infiltrating. Quite a number were advanced and inoperable. We were not trying to produce a unique record of cures, but endeavouring rather to see what could and what could not be done.

One thing that is perfectly clear is that if the primary growth is treated early it can be made to disappear by the use of radon in the great majority of cases, leaving a useful mobile organ. We know also from the work of others that the same result may be obtained by radium element. I repeat that we are not arguing here in favour of the emanation against the element, but merely trying to record the facts as we have seen them.

The second point is that the patients who have died, and there have been ten—a third of the total number—have been advanced cases of carcinoma, cases which

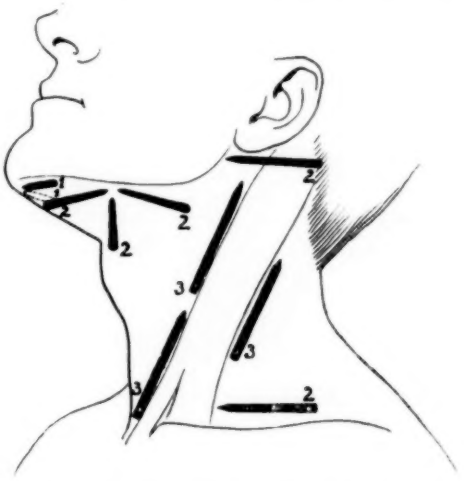


Diagram showing method of irradiating lymphatic areas with radium needles. (Figures refer to milligrammes of radium element in needles.)

would have been classed as inoperable surgically, cases which had in all probability dissemination of disease at the time of treatment. This is to emphasise once again the point that treatment, if it is to be successful, must be before the disease is advanced and disseminated.

The third point that arises prominently from these figures is the unsatisfactory state of our knowledge of the right method of treating the lymphatic glands. It will be noted that the method of treatment adopted by us has varied. In the majority of cases the method of irradiation by radium needles inserted through punctures in the skin has been used. This method has appeared to us to be satisfactory when applied to the lymphatic gland areas in cases of carcinoma of the breast. But it has not turned out uniformly satisfactory for the glands secondary to carcinoma of the tongue.

In seven instances, Nos. 6, 9, 14, 20, 22, 24, and 27, the glands have not responded. Six of the patients have died, and one—Case 27—will probably die soon. In a number of patients regression or disappearance of the glands has been noticed after irradiation, and, although this is encouraging, it is not proof that the glands were secondarily infected with carcinoma and that they were sterilised by radiation. It is well-known that glands which are palpable clinically are often shown histologically to be inflammatory and not carcinomatous. We have no direct evidence that radium puncture does actually sterilise carcinomatous glands. In some instances the glands have been dissected, and it is possible that this should be, at any rate for the present, the method of choice.

THE PROBLEM OF TREATING THE LYMPHATIC GLANDS.

The most difficult problem that has to be asked at the present time is the best method of treating the lymphatic glands. Workers from various parts of the world stress this point, and unanimity of opinion has not been reached. As stated before, we have been employing the method of irradiating the lymphatic areas by inserting radium needles through punctures in the skin, and this has not proved entirely satisfactory, so we are searching for a better method. The Westminster Hospital, in their Reports for 1929, have given some information concerning their results. They seem to have got their best results from dissection of the glands followed by the use of a radium collar.

For the purpose of this lecture I wrote to Mr. Birkett asking what is the method of choice employed at the Manchester Radium Institute. He replies as follows:—

"If there are no palpable glands I have in the past usually adopted an expectant attitude and kept the patient under close observation. Should glands become palpable, then a block dissection is performed, combined with implantation of about 15 needles for a week. Had I the radium available and beds, I should be inclined to use a method of external radiation. . . . . I can say definitely that my method of choice is a block dissection if glands are palpable, and that it is confined to the affected side."

There is an important communication on this subject from the Radium Institute of Paris. It would appear from this that it is their opinion (I trust I do not misrepresent them) that in all cases of epithelioma of the tongue the glands of the neck should be completely excised; and further, that the excised glands should all be examined histologically, and that if any show cancerous infection then further treatment of the neck by radium.

From these remarks it is clear that there is one thing on which all workers agree. They agree that the treatment of the primary tumour of the tongue by radium presents no great difficulty, and the key to the complete cure of the patient lies in the effective treatment of the lymphatic area. With this end in view, we are proposing now a much more active treatment of the glands than we have given in the past. This may be summarised briefly as follows:—

1. When the glands are not clinically enlarged: Block dissection of the affected side, followed by

ANALYSIS OF THIRTY CASES OF EPITHELIOMA OF THE TONGUE TREATED WITH RADON OR RADIUM.

No.	Sex.	Age.	Operability.	Involvement of glands.	Treatment of—		Date of treatment.	Effect on—		Result. (m = months; w = weeks.)	
					Tongue.	Glands.		Tongue.	Glands.		
1	M.	67	+	+ +	Radon seeds.	Radium needles.	11/11/27 6/3/28	Healed.	Not healed.	Died.	4 m.
2	M.	68	+	+	,,	,,	10/12/27 7/2/28 10/8/28	,,	Enlarged later.	Alive and well.	26 m.
3	M.	74	+	+	,,	Radon seeds.	3/1/28 9/3/28	Ulcer smaller. Tongue mobile.	Rapid Enlargement.	Died.	7 m.
4	M.	61	−	+ + Bl.	,,	Radium needles.	20/4/28	Fixed and indurated.	?	,,	11 m.
5	M.	55	+	+ + Bl.	,,	Dissection: glands infected.	8/6/28	Healed.	No recurrence.	Alive and well.	19 m.
6	M.	57	−	+ +	,,	Radium needles.	12/6/28	,,	Enlarged.	Died.	5 m.
7	M.	59	+	+	,,	Dissection: glands infected.	25/5/28	,,	No recurrence.	Alive and well.	19 m.
8	M.	64	+	+ Bl.	,,	No treatment.	19/6/28	,,	,,	,, ,,	18 m.
9	M.	46	−	+ + Bl.	,,	Dissection.	14/7/28	Not healed.	Enlarged.	Died.	4 m.
10	M.	58	+	0	,,	Radium needles.	10/7/28	Ulcer not affected: tongue excised.	No recurrence.	Alive and well.	17 m.
11	M.	69	+	+	,,	,,	27/7/28	Healed.	,,	,, ,,	17 m.
12	M.	62	+	0	,,	Dissection.	16/8/28	,,	,,	Died.*	4 m.
13	M.	73	+	+	,,	Dissection: not infected.	4/9/28	,,	,,	Alive and well.	14 m.
14	M.	69	−	0	,,	Radium needles.	9/10/28	?	Glands became enlarged.	Died.	2 m.
15	M.	56	−	0	,,	,,	12/10/28	Healed.	No recurrence.	Alive and well.	14 m.
16	F.	46	−	0	,,	No treatment.	19/10/28	Growth disappeared, but radium necrosis.	,,	,, ,,	14 m.
17	M.	33	+	0	,,	,,	23/10/28	Healed.	,,	,, ,,	13 m.
18	F.	64	+	+	,,	Radium needles.	2/11/28	,,	,,	,, ,,	14 m.
19	M.	62	+	+	,,	Block dissection + needles: glands infected.	15/11/28	Improved.	?	,, ,,	13 m.
20	M.	52	−	+	Ditto and needle.	Radium needles.	20/11/28	,,	Enlarged.	Died.	8 m.
21	M.	56	+	0	Radon seeds.	,,	4/1/29	Healed.	No recurrence.	Alive and well.	13 m.
22	M.	57	−	+ + Bl.	,,	,,	18/2/29	No improvement.	No improvement.	Died.	4 m.
23	M.	75	−	0	,,	No treatment.	26/3/29	?	?	,,	2 w.
24	M.	69	−	+	,,	Radium collar.	26/4/29	Ulcer improved.	Neck ulcerating.	Not improved. ? Dead.	7 m.
25	F.	39	+	0	,,	Radium needles.	3/5/29	Not affected.	No recurrence.	Alive; tongue excised.	8 m.
26	M.	66	−	0	,,	,,	7/6/29	Ulcer smaller.	Improved.	Not improved.	7 m.
27	M.	63	+	+	,,	,,	15/8/29	Improved.	Enlarged.	Condition not improved.	5 m.
28	M.	58	+	0	Ditto and needles.	,,	13/8/29 7/11/29	Apparently well.	Apparently well.	Alive and well.	5 m.
29	F.	31	+	+	Radon seeds.	,,	20/8/29	,,	,,	,, ,,	5 m.
30	M.	74	+	+	,,	,,	13/9/29	,,	,,	,, ,,	4 m.

Bl. = bilateral. * From carcinoma of œsophagus.

histological examination. If the glands are not infected, nothing more; if the glands are infected, application of a radium collar.

2. When glands are clinically enlarged: Block dissection of the affected side, followed by histological examination. If the glands are not infected, nothing more; if the glands are macroscopically infected, insertion of radium needles after the dissection, or application of a radium collar.

3. When glands are enlarged, fixed, and inoperable: An attempt will be made to bring them to a stage of operability by the use of radium needles or radium collar.

Conclusions.

The use of radium is at one and the same time disappointing, fascinating, and perplexing. It is fascinating because it will bring about the disappearance of a local tumour in an astonishing way in a few weeks, and it holds out the bright prospect of a cure of this dread scourge. It is perplexing because we have not as yet any idea of how it acts, and why in one instance it seems to work like a charm and in another to be of no value. It is disappointing because we cannot secure a hundred per cent. of cures. Though we must admit that this is disappointing there is no reason why we should be down-hearted. Surgery has done its best and yet, in spite of the high standard which the art has reached, it has failed to cure cancer of the tongue. Now it has been shown that radium will heal a tongue without a mutilating operation, leaving the organ perhaps a little scarred but mobile and useful. A distinct step forward has been made, and, in my judgment, the future treatment of cancer of the tongue lies with radium.

The treatment of the lymphatic glands still remains a difficulty, and for that reason, if for no other, it seems clear that radium therapy cannot and should not be divorced from surgery in the modern treatment of cancer.

One last point is overwhelmingly clear—namely, that the treatment of cancer, if it is to be successful, must be undertaken early, whether that treatment is to be by radium, by surgery, or by anything else. A great many of our patients come to us too late for effective treatment. The medical profession cannot be held to blame for this. General practitioners are well educated and do not hold their patients long before sending them to the surgeon. The difficulty lies with the patients. It is often months from the onset of symptoms before they will ask advice from their doctor, and during this time the fatal dissemination may have taken place. The public needs educating. Is it not the duty of the medical profession to say so to say so in emphatic terms, and to keep on saying so?

Hunterian Lecture

ON

IMMUNITY FROM A NEW POINT OF VIEW.

Delivered before the Hunterian Society on Jan. 27th, 1930,

By GUSTAVE MONOD, M.D. Paris, M.R.C.P. Lond.

(Paris and Vichy).

This evening I am asking you to consider the problem of immunity from the angle of the hydrologist, and I am delighted to show you something of the fascinating problems that are confronting those of us who study modern hydrology and who find themselves, to their own surprise, promoted from the modest rank of "water doctors" to the high dignity of pioneers in the field of biology. I do not intend in this short time to endeavour to solve any particular problem, but just to discuss a few particular things which have puzzled us.

"Why does Opium Induce Sleep?"

You remember the question? I must take you back to Molière. In the interlude of "Le Malade Imaginaire," a play written at the expense of the doctor and for his greatest benefit, there is a grotesque ceremony, where a candidate is given the M.D. degree by a jury of pointed bonnets. He is quizzed in Latin, the true international language (which we call dead merely because we let it sleep). And this is the question asked by the President: "Cur opium facit dormire?" Answer: "Quia est in ea virtus dormitiva qui facit dormire." The jury is delighted: "Bene, bene, bene respondere. Dignus, dignus es intrare in nostro docto corpore."

We laugh too, with the public. But stop and consider what *you* would answer to such a question. Indeed, "bene respondere"—"good answer." It is modest. It expresses with candid simplicity the ignoramus of Science confronted with the dark mystery of causes. Felix qui potuit . . . Happy would be the one who could ascertain causes. No, it is not the answer that is wrong; it is the question. It should not be *Cur*. It should be *Quomodo*.

Let us to-night stand at the strong-room door of Science. Not that we can pretend to break through, but perhaps we may see a little gleam of light peeping underneath.

Biology on a Physical Basis.

Our generation has been trained to consider the chemical constitution of all bodies and more especially drugs. There is little doubt that the new generation will consider matter from a quite different angle. The modern physicist—I might say the British physicist—has taught us to look at the atomic world from the gravitation point of view. To the ancient astronomer nothing looked more eternally at rest than the stars, but science has told us stories about their wanderings that no mortal mind could have imagined. The modern biologist is going in turn through a similar experience. All the phenomena of life, without exception, are derived from chemico-physical reactions in water, and therefore it is important that we, as physicians, should learn to imagine the gravitation in the atomic world, the games of the molecules, of the ions, of the electrons, which determine the phenomena of which we see the manifestations; diffusion, osmotic pressure, the equilibrium of the molecular concentration, the reactions of the colloids, and so many other procedures which were never even mentioned a quarter of a century ago.

We smile when we are questioned on the sedative virtues of opium. But when we are asked, for instance, how antitetanic serum immunises against tetanus, then we answer quite seriously. We seem to see an explanation. We use a most bewildering phraseology. But when all is considered I wonder if we have expressed any other truth than this: that antitetanic serum has an antitetanic virtue which neutralises tetanic toxin.

Again how? Might what we now know of the constitution of matter help us in other ways? We know that atoms are like many suns gravitating at various speeds, but we know nothing of their relative speeds. It might be that atoms only react on atoms when there is a certain ratio between their rate of revolutions. An idea of this is given to us by the familiar experience of changing gear when driving a car. To avoid jerks we modify the relative speed of the cog wheels to make them engage. Perhaps there may be a similar phenomenon in the case of a

toxin combining with a tissue. The experiment of Pasteur, showing how a normally immune hen can be inoculated with disease if her temperature is lowered (or if the rate of atomic vibrations is lowered) may be an illustration of such a hypothesis.

Immunisation has been considered up till now merely as a biological phenomenon. I want to show you to-night how immunity, and even specific immunity, can be acquired from non-organic antigens.

A Few Experimental Facts.

I am anxious you should feel the solid rock of facts underlying this far too speculative discourse. Sparteine sulphate, in a dose of 7 mg. injected into an animal of 100 grammes in weight, is always fatal. Now if a higher dose, say, 10 mg., of the poison is mixed within the syringe with 5 c.cm. of mineral water from La Bourboule or Mont Dore springs, the animals do not present any symptom of intoxication. But if you use a similar dose of Chatel Guyon water, death is again bound to follow. On the other hand, this Chatel Guyon water neutralises the venom of the adder. And St. Nectaire water acts in a similar way against diphtheritic toxin. The toxin of tetanus is checked by La Bourboule water and not by Mont Dore, phallin poison by Mont Dore water and not by La Bourboule.

This is not true only for toxins treated in vitro; these various protective actions develop exactly in the same way if these various waters are injected hypodermically. But we must consider this extremely striking fact, that such protection, or *phylaxis* does not develop immediately, and only reaches its maximum after seven days. There is a period of incubation for phylaxis to develop, just as there is an incubation period for the toxin to develop its action.

As regards the protective action of certain mineral waters against certain microbes, there is no doubt experimentally that it does exist, but we are still in the early stages of elucidating the matter. How deeply do we feel the terrible loss Science has sustained from the premature death of Prof. Billard, the pioneer in this field of investigations!

We do not pretend that mineral waters have any sort of monopoly. They are an easy and cheap way of producing immunisation, but other electrolytes will certainly be discovered or invented which are endowed with the same property. Experiments made by that well-known biologist, Auguste Lumière, show that immunity—the production of antibodies—may be due to well-defined chemical bodies, such as saponin, a property that seemed to be exclusive to proteins. This goes so far that the serum of animals thus immunised acquires a protective action. We might call it chemical serotherapy. The protective action, this immunising action, by mineral waters is a new discovery, a most startling discovery, and one that is worth our active attention.

Mineral Water in Anaphylaxis.

Now I will ask you to consider, from a different point of view, the part which mineral waters play in the phenomena discovered by our great physiologist, Prof. Ch. Richet, which he calls anaphylaxis. Let us return to the solid ground of experimental facts.

If an animal be injected with horse serum and treated for 21 days with a daily injection of Vichy water, after which treatment a second dose of horse serum is given hypodermically, then the untreated control animals are found to die or become gravely ill, whilst the treated ones do not show the slightest reaction. This protective action is given also by Royat and La Bourboule waters. This is not merely the result of the action of water on a toxin. It is a true defensive reaction. It is due to the action of the bivalent bodies of the mineral water creating around the cells an electrostatic field of protection. We shall further consider presently this problem, which was studied and solved by Loeb, the American biologist. The phylactic action of mineral waters is far from being a general property. Prof. Perrin has experimented with the waters in the east of France. The results were positive with the Contrexéville and Vittel springs, negative with Luxeuil and Bourbonne. It is evident that the protecting property is not due to chemical composition. It does not develop if the waters are replaced by solutions of the same composition. Prof. Perrin suggests that it is the physical equilibrium that determines it, and most especially ionic dissociation.

We said a three-weeks treatment, and is it not a curious coincidence that the length of a "cure" in a spa has been fixed by clinical empiricism at exactly the same period?

Billard's Discovery.

The immunising property of mineral waters must certainly appear to you, as it does to me, as a most remarkable fact, and probably you are anxious to know how this discovery was made and why it should occur to any human brain to try such experiments. We might say hazard. Yes, but chiefly observation and open-mindedness, and perhaps a touch of genius. The story starts in so pretty a way that I fear I cannot resist the temptation of telling it.

Let us suppose ourselves transported to the centre of France, to the picturesque, volcanic district of the Auvergne mountains, a few years ago. It is a cold early spring morning, and the old shepherd has just given an outing to his flock after the long winter stabling under the snow. You may imagine the man, grey clad, standing like a statue on a black rock, leaning on his stick. The sheep are enjoying the fresh air, but there is very little to satisfy their appetite—just a few young green heads of broom, sprouting out where the snow has vanished.

Then watch a vigorous, middle-aged man climbing up the hill. He has escaped from his physiological laboratory in the medical school of Clermont Ferrand. It is Prof. Billard himself. He stops to talk to the peasant. The shepherd has two great opportunities of becoming an observer: time and silence. He listens to Nature. The scientist questions Nature. Well, it appears that at this time of the year the animals are depressed, and so clumsy that poachers have been known to outrun a wild goat. And, adds the shepherd, if bitten by a viper they suffer no ill-effects from the bite. A thought flashes through the mind of the scientist. To him the broom the sheep are feeding on implies spartein. These sheep are doped. And he knows that spartein is antagonistic to the toxin of tetanus. Why not to the snake venom, which has also a special affinity for the nerve centres? And down he walks towards his laboratory, determined to see the problem through.

Between spartein and the toxin there is a race for the nerve centres. If spartein reaches the goal first, it is too late for the toxin. Immunity is established. In order to diffuse spartein more rapidly through the organism, why not mix it with various electrolytic solutions? Billard has these solutions ready made at hand, and he tries the various mineral waters gushing up in his district. By chance he finds one neutralising the spartein he is experimenting with, and it is from this observation that he started his long series of researches, only stopped by premature death 12 months ago, from pneumococcal meningitis, within 24 hours of taking a winter stroll in his beloved Auvergne mountains.

Specificity and Sensibilisation.

We may here stop for a moment to consider by what means a certain mineral water may protect the organism against a specific toxin. A very similar point will arise when we have to consider the question of desensibilisation, and the part played by soaps. We may conceive that certain toxins, and for the sake of example we may select the tetanic toxin, have a special affinity, a positive chemiotaxy, for stearates. (And this may be inferred from the researches of H. Vincent.) Therefore, if a mineral water exists with electrolytes combined in such a way that with stearates it forms

an insoluble soap, a barrier can be built, preventing the tetanic toxin from invading the neuron. The nervous tissues of those animals which are sensitive to adder venom fix the poison in vitro. But an emulsion of the neuron of the pig, an animal refractory to the venom, does not fix it. On the other hand, spartein is fixed by an emulsion of the neurons of all animals.

The question of time is of the utmost importance. Let us return to experimental findings. Tetanic toxin takes a certain time to develop its action, and the immunising action of the mineral water must be synchronised to the time of action taken by the toxin. For instance, we inject a dose of toxin lethal to the guinea-pig. One hour later we inject 10 c.cm. of La Bourboule water. The animal dies. The same result occurs if the water is injected three hours later. The immunity has developed too soon. But if the water is injected five hours later, the animal survives, because the immunising effect has occurred at the same time as the toxic action: If 12 hours elapse before the water is injected, then it is too late, and the toxin works before the immunising action develops; the animal dies.

Lipoids not Proteins.

If you want to understand such an action you must admit the working hypothesis of Billard, that we are sensibilised not by proteins but by lipoids. The fact is very likely, if we consider that coagulation by heat does not hinder in any way the anaphylactic effect of antigens. Why not admit, as a very likely possibility, that the lipoids are responsible? Billard himself has observed anaphylactic shock on guinea-pigs, prepared with lipoidic antigens from the calf and started with calf serum. Another instance of anaphylaxis by lipoids is the celebrated case described by the late Prof. Widal, of a sheep merchant who developed asthma from the mere smell of greasy wool.

If you admit such an hypothesis, then the part mineral waters play in the desensibilisation of the organism is made easier to understand, providing that in this instance again we consider saponification. Organic soaps mobilise not only lipoids but insoluble fats. It is an experimental fact that those mineral waters which dissolve soap most readily are exactly the waters endowed with the greatest power of desensibilisation against anaphylaxis. And if we examine such a mechanism from a different angle, we may admit that these waters introduce into the organism active electrolytes, which disperse the soaps and mobilise the lipoids more easily.

If such be the case, then we can foresee a new class of drugs, acting merely by virtue of their physical properties; in other words, by vibration. The production of such a material has been achieved by Roger in his laboratory of La Sorbonne in Paris, and the results appear quite satisfactory. It is used externally, in the same way as an embrocation. How it really acts is still a problem. Experiments are actually being carried out on plants at the moment. It seems that it is in this way that foreign lipoids are washed out of the organism and prevented from getting fixed. The combination during the period of incubation is checked, and when the "injection déchainante" is given there is no shock. We do not go so far as to pretend that proteins play no part in anaphylaxis, but we think they are controlled and determined by soaps and lipoids. It is through the latter that mineral waters play their protective part against anaphylaxis.

Origin of Mineral Waters.

That mineral waters prove to be very complex substances is no surprise when you think of their origin. I am speaking merely of the plutonic waters gushing up in volcanic districts. We know that they come from very deep, for, in the search for oil in the Auvergne, shafts have been bored over 3000 feet deep, and waters have been found quite similar to Vichy water, for instance. There is no doubt that they come from a far deeper layer still. They are not surface waters absorbed and rejected, but synthetic waters from distillation of granite at a very high temperature and under extreme pressure, under the action of carbonic gas. They come from what we might call the underground melting-pot. We know nothing of the condition of matter under these conditions, but we suspect it to be a sort of sample of the concentrated primary nebula. Mineral springs are the last remnants of plutonic phenomena; in fact, miniature volcanoes. The spectroscope reveals many constituents, and there is little doubt that still more will be revealed. Geologists have no explanation to give as regards the origin of the tremendous volume of carbonic gas produced during the succession of geological epochs. In a few words: mineral water is a very complex solution of electrolytes, which has not yet found, when it reaches the surface, its normal equilibrium.

If we consider the question from the historical point of view we see that there always has been some mystery surrounding springs. There were supposed to be a sort of emanation of the divinity, and some god or goddess presided over each. A spring was a shrine. Then came the empirical period. They did not speak of the *virtues* of waters but of their *action*. Some patients got cured, told their story, and sent to the same spring those who suffered from the same ailments. And that was the beginning of the specialisation of springs. Later on the waters were studied from the chemical point of view, and it is from the analysis of the waters that the scientist tried to deduce the explanation of their origin. It was not until the present century that their physical and biological properties were taken into consideration, firstly by a young French scientist, Fleig, who died quite young, leaving us a marvellous field of research and of investigation.

Their Biochemistry.

Let us now revert to the composition of mineral waters. We may take as a type the water that has been most especially studied: that of Vichy. Until lately chemists only told us about the elements which were present in large quantities, such as sodium bicarbonate and sodium sulphate. But lately Mr. Bardet, of the Institute of Hydrology in Paris, studying the composition of these waters with the spectroscope, has discovered a true secondary mineralisation, and has given us a new list of elements which were totally unsuspected. Of these we may mention lead, germanium, gallium, molybdene, copper, antimony, cobalt, mercury, nickel, gold, and thallium. As a matter of fact, this new list mentions no less than 42 elements, and there is very little doubt that when the list is completed it will include practically the whole list of the cosmic elements.

And now for the physicist. He in turn discovers quite a number of unknown properties: radioactivity, rare gases, phenomena of osmosis, of ionisation, of catalysis. He studies the colloidal equilibrium of salts, their electrical potential, and shows that they constitute a mechanical living complex, which cannot be compared with any artificial solution and which would baffle the efforts of synthesis.

Some day much more will be known about these actual problems. We may prophesy safely that the physician of to-morrow will have to be a biochemist. He will know about health and disease vibrations. He will know how to measure them and how to use them. A good deal has been done already, but the work of the pioneers has not yet reached the scientific stage when results can be given in figures by mechanical means. An example of such a device is given by Prof. Puech, when he measures the electrical exchanges between a patient in a bath and the water of the bath. He has shown that certain organisms work like a battery, taking on or letting off electric charges. This should be a guide to us in physical treatment. On the other hand, we have all heard of methods aiming at the detection of life emanations and at measuring them; but such methods failed to exclude in their measurements that personal equation which does not allow control. Yet it might happen any

day that some new technique might be evolved, and then we should have to recognise that we had failed to give due recognition to some of the most daring prospectors in this field of investigation.

Our minds are now far nearer considering this world of vibrations than they were when we were studying medicine, which was, for most of us, in those prehistoric periods which we now call pre-war. It seems, for instance, that vitamins are very closely akin to light—in fact, a sort of transubstantiation of light. They have been considered mostly from the chemical point of view. They should be, and they are, studied now also from the physical point of view.

That mineral waters must be considered as a biological milieu we have many proofs. First of all, it is rather surprising to find out that if arsenic is injected into an animal as the arsenicate (as in La Bourboule water) the animal will stand a dose of the poison corresponding to 1½ g. in a human being of average weight. La Bourboule water may therefore be considered not only as a physiological serum but as a therapeutic serum of great value. It is from this experiment that researches were conducted by Billard, and that he was driven to admit that mineral waters might be considered as sera, not only blood-serum but interstitial sera. These mineral waters from Balaruc, Uriage, La Bourboule, St. Nectaire, Vichy, &c., injected into the veins are better tolerated than any artificial serum. They are more quickly eliminated and promote better excretion.

If you bleed an animal and replace the blood by the same quantity of La Bourboule water an active globular reaction is started, and the normal ratio of hæmoglobin is promptly returned to. The same results follow the use of quite a different type of water—namely, Vichy water.

Another curious fact is that, whereas a surgical wound normally bleeds for about 20 minutes, if the animal is treated with these waters the bleeding time is reduced to three minutes. Billard and Ferreyrolles have kept a frog muscle living and active for five days in Bourboule water, breaking easily the record established by Carrel in his famous experiments. The complexity of such a natural serum cannot be reproduced artificially. And such complexity seems to be indispensable.

Here is another experiment which I want to submit to you. If you put a frog alive into a 5 per cent. salt solution the frog develops œdema; its lymphatic spaces fill up and the weight of the water-logged animal goes up nearly 100 per cent. But if you put such an animal into mineral water of the same concentration, the results are quite different. Œdema is very slow to develop. The laws of osmosis do not act any more. A new factor comes into action: the interference of bivalent salts, which have an antagonistic action towards sodium chloride (as demonstrated by James Loeb). These create a salt diffusion electrostatic field. There is a difference in potentiality between the living tissue and the liquid it bathes in. Such a difference has been measured by Prof. Puech, and he calls it "indice de nutrition." The electrical current that flows in or out can be recorded to a hundredth of a milliampère.

Now plasma is nothing else but a colloidal solution in an electrolytic milieu. Between such a solution and a mineral water of the same nature interchange is established. It is well known that electrolytes, loaded as they are, act like shells bursting amongst protein micellæ. Such seems to be the action of mineral water; it brings to the organism an electrical charge and mineral elements, which are indispensable for the equilibrium of colloidal proteins—in a word, for life itself.

Conclusion.

In this lecture I have adopted two different attitudes. One is founded on the ground of experimental facts; the second floats on the clouds of speculation.

From the facts we must conclude that mineral waters have a more far-reaching effect than was previously dreamed of, and that it is quite an open question whether the effects are always beneficial. At any rate, the physician needs to be more than careful. He deals with a two-edged weapon. Prof. Billard himself wrote: "When I was a young physician, my faith in the therapeutic virtues of mineral waters was not too strong. Nowadays, if I practised in a spa, it would not be without some sort of apprehension every time that I wrote out a prescription." And true it is that to-day we are exceedingly careful, and that most of us have adopted what might be called the mild type of "cure," as compared with the full "cure" of our predecessors.

From the speculations I have indulged in—this is the Gallic touch of the spirit of my race—let us also draw a conclusion:

> "For nothing worthy proving can be proven
> Nor yet disproven: wherefore thou be wise,
> Cleave to the sunnier side of doubt."

After all let us be pragmatic. The sunnier side of doubt is the side we must bring our patients to, out of the foggy side of physical and psychical distress. Why should we not utilise injections of waters in certain cases? For instance, previous to operations, to prevent bleeding, and after operations as we use artificial sera? St. Nectaire water neutralises diphtheritic toxins; why not, in addition to treatment, try it on patients? Why not Bourboule water when tetanus is suspected, or Mont Dore water in cases of phallin poisoning. Every year we hear of mushroom poisoning, still I do not know that this simple treatment has ever been tried on a human being. A practical application of these experiments might be found in cases when it is important to protect the organism from neurotropic toxins. Could injected mineral water check post-vaccinal encephalitis? Some natural water might prove to have a specific phylactic action. I am afraid that for the time being we cannot do more than theorise on this point.

The anti-anaphylactic effect of waters might be tried on most chronic affections. It has been empirically applied, and has been successful in spa treatment for centuries. It might now be carried on with more success, because we know a little more, and feel a little bolder in consequence. Prof. Billard achieved complete success in a severe case of chronic asthma with Bourboule water. He brought his patient over to the sunnier side of doubt.

What about your waters in Great Britain? There is no doubt that their special virtues are only waiting to be discovered, and if an echo of this lecture reaches the ears of any of my colleagues on this side, who are endowed with the pioneer's enthusiasm, I feel I have not wasted my time to-night.

Birmingham Hospitals.—The competition of a selected number of architects for the erection of the new hospital centre at Edgbaston has now been determined by the acceptance of the plans of Messrs. Lancaster and Lodge, of London. Of the 125 acres given by Messrs. Cadbury, 25 adjacent to the University have been set aside for three separate buildings. The hospital proper will have 750 beds for ordinary patients and 100 for paying patients, and a second building will house the medical school, which is to replace the General and Queen's Hospitals as the headquarters of medical education in Birmingham. The establishment of the school on this site will facilitate the transfer of the Medical Faculty of the University from Edmond-street to Edgbaston, where the biological departments are already placed. The nurses' home has been designed on a generous scale. It is estimated that the buildings will cost a million to erect, without allowing for equipment, which will necessarily need a further very large sum. The medical officer of health for Birmingham and the clerk to the guardians have made a joint calculation that next year the city ought to be in possession of 2400 general hospital beds, but that the number will be short of that total by at least 700. The hospital will be under the joint control of the General and Queen's Hospitals which are to be amalgamated for all purposes.—Last year the income of the Birmingham Hospitals Contribution Scheme, based upon the old-established Hospital Saturday Fund, exceeded £180,000. Under the scheme workpeople contribute 2*d.* per week to the fund, and the employers give 25 per cent. of the total thus raised. The number of workmen members of the fund is 274,000, employed by 4745 firms.

THE ÆTIOLOGY OF DIVERTICULITIS.

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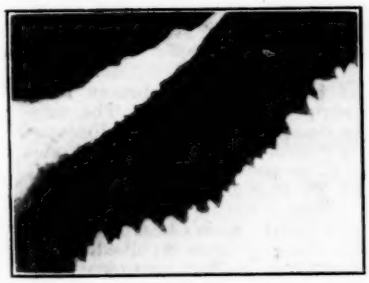
A GREAT deal of interest and much speculation has centred round the ætiology of multiple diverticula of the colon and the exact nature of the factors which eventually lead to their formation. Congenital diverticula of the alimentary tract have been known and described for very many years and their origin is not in doubt, but no one, I think, now believes that these diverticula of the colon which set up diverticulitis are congenital in origin. I shall not stress the various arguments against their congenital origin; two will be sufficient. The fact that multiple diverticula practically only occur after middle age is one very strong argument, and the other is that since cases have been watched with X rays over long periods it has become quite obvious that the condition is often, if not always, progressive, and that in course of time diverticula can be seen to develop in areas of the colon which were previously free.

There is always considerable difficulty in making an exact study of the earliest stages of any disease, owing largely to the difficulty of obtaining suitable material. While plenty of specimens of fully developed diverticulitis existed there were, until recently, none of the early stages. With the assistance of Dr. Cuthbert Dukes, who very carefully investigated a large number of specimens, we have been fortunate enough to find evidence of the very earliest stages. Before this our knowledge of the early stages of the development of diverticula was confined to the evidence of X ray photographs, which not infrequently showed a curious appearance of the colon wall as apparently a definite precursor of diverticulitis. The colon wall in these photographs appeared to be more fixed and immobile than normal, and showed a curious irregular outline. This condition is well shown in Fig. 1. Dr. E. I. Spriggs, who was one of the first to describe the appearances, called it "pallisading"; he and his associates concluded that the appearances were due to a chronic inflammatory condition of the colon wall, and they further argued that this inflammatory condition gave rise to the formation of diverticula. In other words, acquired diverticula were, they held, the result of a pre-existing inflammatory condition of the bowel wall. The evidence that I have obtained by a study of the early changes in the colon wall itself completely negatives this view and shows that the development of multiple diverticula is the primary stage and is unaccompanied by any inflammatory condition.

FIG. 1.



Radiogram (semi-diagrammatic) showing the wall of the colon in the early stage of diverticula formation.

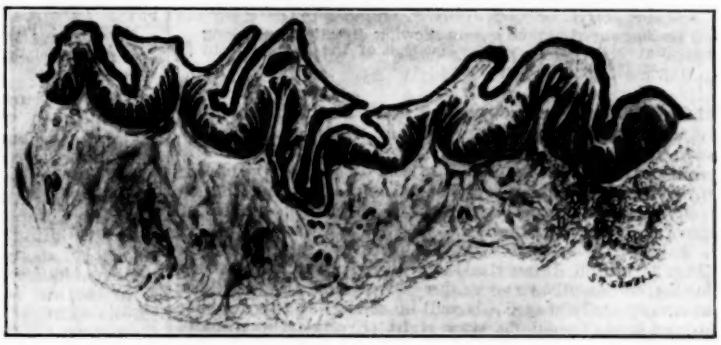
The Relation of Diverticula to Inflammation.

The earliest stage in the development of diverticula that I have observed is a condition in which there are large numbers of small millet-seed projections on the outside of the colon. They are arranged in rows, mostly along the edges of the longitudinal muscle bands, and tend to occur at the points where the lymphatics and blood-vessels perforate the muscular coat. This was first pointed out in 1920 by the late Mr. Hamilton Drummond.[1] I have observed this millet-seed condition in several cases when the abdomen has been opened for some other condition, and am satisfied that there is, as a rule, no inflammation of the bowel wall accompanying it. In one case I observed very active inflammation of the colon wall around these millet-seed diverticula; some six or seven inches of the bowel were greatly thickened and quite stiff from the inflammation, which involved nearly the whole wall of the bowel and was most intense round the diverticula. It was quite clear in this case that the inflammation was secondary to the formation of the diverticula and was the very earliest stage of an extensive diverticulitis. Fig. 2 shows (very much magnified) the appearance in cross-section of the colon wall in a very early stage of multiple diverticula. It will be seen that several diverticula are pushing their way into and through the muscular coat of the bowel. Apart from this pouching of the mucous membrane the bowel wall is normal and shows no inflammatory changes. A very irregular outline of the colon wall is produced. If one compares the appearance of the colon wall in Fig. 2 with that in the X ray photograph in Fig. 1 I do not think it is possible to doubt that the photographic appearances seen in Fig. 1 are due to the condition of the bowel wall shown in Fig. 2 and that it is quite unnecessary to assume that the appearances in Fig. 1 are due to inflammation.

FIG. 3.

Microscopical section of a very early diverticulum showing a foreign body and abscess formation around the end in the subserous layer.

FIG. 2.



Microscopical section of the wall of the colon in the early stage of diverticula formation. Note injected outline and absence of inflammation.

[1] THE LANCET, 1920, i., 155.

It seems to me most probable that diverticula start as true pulsion herniæ of the mucous membrane through the ridges in the circular muscle coat at the weak points where the blood-vessels enter, and that after their formation a retained fæcal content is likely to set up inflammation which spreads to the neighbouring tissues. This secondary inflammation may never occur, or it may take place at almost any stage in the development of the pouches. The nature of the process which starts the condition is at present only conjecturable, but it seems probable that some degeneration of the bowel wall, probably from age and unnatural conditions of the bowel function, is the initial factor. In favour of this view is the fact that the condition is practically confined to the second half of life and that diverticula of the colon are most frequently seen in fat persons. I have seldom seen a

FIG. 4.

Radiogram of barium enema showing diverticula all along the colon, taken after evacuation of the barium from the bowel.

thin individual with diverticulitis. The rapid deposit of fat is generally a sign of poor metabolism and is usually accompanied by a marked degeneration of the musculature. It is probably this degeneration of the muscular wall of the bowel which explains the common association of excessive fat and the development of diverticula in the colon.

I have been fortunate in obtaining a specimen (Fig. 3), which shows the development of inflammation in the colon wall as a secondary result of a diverticulum at a very early stage. It will be seen that the diverticulum has pushed its way right through the muscle coat into the subperitoneal tissue and that an abscess has begun to form round its tip, probably as the result of the small foreign body present in the apex of the diverticulum. This specimen shows the very earliest stage in the development of a diverticulitis, and it is easy to realise that if this condition occurs over a large area of the colon wall it will in time produce the typical fibrous stricture that we see in cases of this type of diverticulitis.

Two Varieties of Diverticulitis.

There appear to be two very different and distinct types of case commonly seen. In the first the colon wall becomes inflamed over a fairly wide area at a very early stage in the development of the diverticula, as seen in Fig. 3. This results, in course of time, in very dense and progressive thickening and fibrosis of the colon wall in the affected area. Ultimately a firm fibrous stricture develops, with greatly thickened walls and firm adhesions to surrounding structures. This type of case from a clinical point of view closely resembles carcinoma of the colon, and is not infrequently mistaken for it. X ray photographs fail to show the condition well, as the narrowed pouches do not readily fill with barium solution. This type of case can only be treated satisfactorily by resection of the damaged area of colon, or by establishing a colostomy opening above the obstruction.

The second type is the commoner and is that in which the diverticula develop and grow, often to a considerable size, without any accompanying inflammation. Such cases are rightly called diverticulosis to distinguish them from the inflammatory type (see Fig. 4). No symptoms are present and the disorder is only potentially serious. Inflammation may eventually occur, as the result of the irritation set up by hard retained fæcal matter in one or more of the pouches, with the result that an abscess forms outside the colon or there is perforation into the general peritoneal cavity with peritonitis. Obstruction may result from adhesions, but is not so common as in the first type, and the same dense thickening and fibrosis does not occur.

Conclusions.

1. The earliest stage in the development of diverticulitis is the formation of pulsion diverticula in the colon wall due to weakness of the musculature. 2. Inflammation is always secondary and is due to foreign bodies or fæcal material getting into the diverticula. 3. The X ray appearances which have been supposed to be due to inflammation are due to very small but numerous diverticula of the mucous membrane. 4. Secondary inflammation of the pouches may occur at an early stage and produce dense fibrosis; it may not occur at all, or only very late in the development of the diverticula.

A NEW THORACOSCOPE.

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THE instrument to be described embraces new principles in thoracoscope construction. The one instrument serves the double purpose of endoscope and active electrode for cauterising; thus only one puncture is needed. It is used with a diathermy current. It is made by Mr. R. Schranz, of the Genito-Urinary Company, who has given up a great deal of time in coming to the City of London Chest Hospital to study at first hand the problems involved. We believe that we have evolved an instrument which is in certain respects an advance on previous ones, the handling of which is easy, and which very greatly facilitates the technique of severing adhesions. The original Jacobæus instrument I personally found difficult, and, judging by the number of its modifications, others have evidently had the same experience. The field of vision, at right angles to the instrument, was awkward. Moreover, two punctures were necessary. Cauterising might be long and tedious; and smoke would not infrequently obscure the view. On reading of the Davidson operating thoracoscope (New York), I tried this, and after a considerable modification of the electrode by Mr. Schranz, I found it very good; it is this instrument that inspired the work on the one to be described. There are, however, in my opinion, two or three rather strong objections to the Davidson instrument. Firstly, it is too big. The wound made is unpleasantly large. Secondly, it is oval in shape, which increases the chances of surgical emphysema as the instrument has to be rotated during use, and so opens up the tissues to the pneumothorax. Thirdly, the instrument itself has

to be pushed to and fro in the chest wall during manipulation, instead of working in a cannula like the Jacobæus instrument, this again making surgical emphysema and sepsis more likely, and leaving a wide opening into the pleural cavity which needs very careful stitching afterwards.

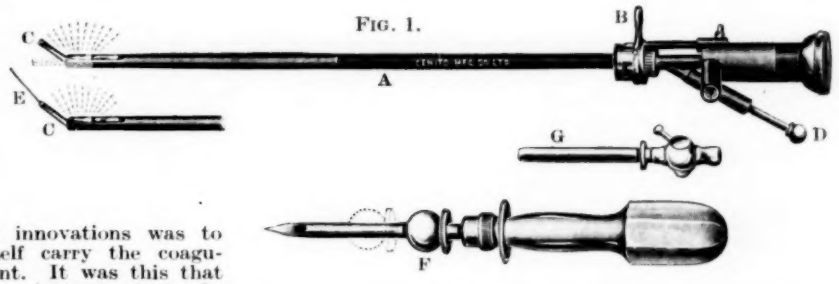
The advantages of the new instrument may be summarised briefly as follows: 1. Its small calibre (18 Charrière gauge). 2. Its working through a cannula. 3. The need for only one puncture. 4. The excellent field of vision, which is at an angle of only 30° off the axis, thus simplifying orientation. 5. The electrode being placed just beyond the lamp it is as easy to touch as to see an adhesion. 6. It is a diathermy instrument—the current being absolutely under control of the operator by a foot-switch. With this current a suitable adhesion can be first coagulated and then cut through in a few moments, with no production of smoke. 7. The whole instrument can be boiled.

One of the principal innovations was to make the telescope itself carry the coagulating and cutting current. It was this that enabled the size of the instrument to be made reasonably small. The coagulating electrode is large, thus rendering dangerous hæmorrhage practically an impossibility. Through this large electrode is pushed, by a simple device, the cutting wire made of tungsten, which is strong and not easily bent.

Description of the Thoracoscope.

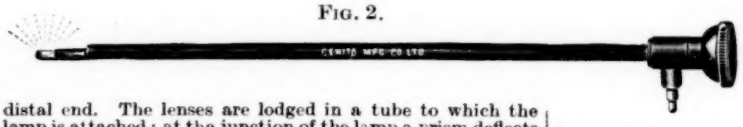
The following is a more technical description of the instrument (Fig. 1).

FIG. 1.



It consists of a metal sheath (A), 25 cm. long, covered with a special insulating compound on the outside. The distal end has a terminal and a lateral opening. At the junction of these a round bar is fixed, which acts at a pivot for the diathermy electrode. At the proximal end a revolving collar with a helical groove controls the movement and position of the telescope (B). By means of this device the movement of the telescope along the axis of the sheath imparts the requisite tilt to the hinged electrode at the distal end. The lenses are lodged in a tube to which the lamp is attached; at the junction of the lamp a prism deflects the optical axis by 30°. The lamp case carries the actual diathermy electrode which is hinged to the case (C). A fine tube runs along the telescope from the proximal end to the junction of the lamp; it then continues at the bottom of the lamp case, and emerges at the joint of the diathermy electrode with the lamp. Through this fine channel a tungsten wire passes right to the tip of the hollow diathermy electrode. The wire is controlled at the proximal end by an insulated handle (D) by means of which it can be pushed forward, beyond the diathermy electrode, to the extent of three-quarters of an inch (E), and withdrawn at will.

FIG. 2.



The cannula of the trocar with which the chest is punctured, and through which the instrument is passed, has an adjustable guard in the shape of a ball (F); this can be clamped at any distance from the end of the cannula. If, for any reason, the thoracoscope has to be temporarily withdrawn from the pleural cavity, a faucet (G) with tap is inserted into the opening of the cannula to prevent escape of air. This also allows fluid to be withdrawn or air to be introduced if needed, pressures to be taken, &c.

This instrument suffices to deal with suitable adhesions favourably located. If, however, the lung is attached to the parietal pleura by a short adhesion, or one into which lung tissue projects, great care must be exercised to sever such a structure close to the parietal pleura. For this local or general anæsthesia is probably necessary, preferably the former. For this purpose we have devised an instrument very similar in construction to the cutting thoracoscope. In this the diathermy electrode and the wire channel are replaced by a fine cannula with a hypodermic needle at the tip. Another possible use suggested for this instrument is the injection of an adhesion with lipiodol, when very considerable doubt exists of the presence of lung tissue; subsequent radiography will give the desired information. Experiments I have made with meat similarly injected suggest that if the injected adhesion is afterwards severed by diathermy no free iodine is liberated.

In addition to the instruments already described, two additional wide-angled telescopes for a preliminary examination of the pleural cavity can be used, one having the optical axis deflected at the same angle as the operating instrument (Fig. 2), the other at an angle of 90°, which would enable one to view a side of a wide adhesion inaccessible to the other telescope.

When an adhesion is located, a portion about 8 mm. long is coagulated, the diathermy electrode being applied both to the back and the front of it, if necessary. The tungsten wire is then pushed forward and applied to the centre of the coagulated section. The cutting current is now switched on, and the adhesion severed. Purely fibrous bands can be cut through in a second without previous coagulation, as there is no bleeding. A special diathermy apparatus is used for this purpose, designed by the Genito-Urinary Company, producing a coagulating (diathermy) and a cutting (endothermy) current. A selector switch is fitted on the top of the panel by means of which either one or the other type of current can be applied. The apparatus is controlled by the operator himself by a foot-switch. The strength of the current is regulated according to the size or resistance of the adhesion, and for this purpose a regulator with an empirical scale marked 0–10 is provided. The patient is connected to the other pole of the machine through an indifferent electrode—that is, a large-sized lead plate covered with a towel soaked in 10 per cent. saline solution. This is placed on the operating table and the patient lies on it, thus making good contact with his own weight.

NORTH STAFFORDSHIRE CRIPPLES' AID SOCIETY.—This society proposes to enlarge the Cripples Hospital at Hartshill, Stoke-on-Trent, at a cost of £20,000, and it is stated that the Ministry of Health regard the plans as "a model for similar institutions." The enlargements will include a new out-patient department, an operating theatre, an X ray room, and accommodation for nurses and staff. Viscountess Ednam, president of the society, points out that much of the work of an orthopædic hospital can be carried on by means of out-patient treatment, which at Hartshill, costs approximately 7*s.* per week, as compared with £2 9*s.* for in-patients.

TREATMENT OF BILHARZIASIS WITH A NEW COMPOUND "FOUADIN."

REPORT ON 2041 CASES.

BY M. KHALIL, M.D. BRUX., PH.D., M.R.C.P. LOND.,

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AND

DR. M. H. BETACHE,

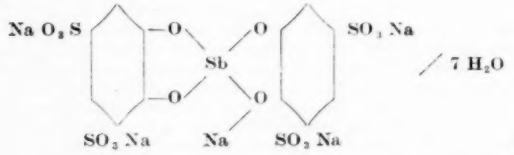
OF THE BILHARZIA RESEARCH SECTION.

THE specific treatment of bilharzia was introduced by McDonagh in 1915 and J. B. Christopherson in 1918, employing intravenous injections of tartar emetic. This was found to be superior to intravenous injection of emetine which was introduced in 1916.

Tartar emetic is the drug employed in the anthelmintic hospitals in Egypt where nearly 250,000 cases are treated yearly. Tartar emetic is a toxic drug. It causes an intense local inflammation if it finds its way into the tissues. In children and also in women, where the veins are either very small or embedded in fat, it is difficult to give intravenous injections. Statistics show that on an average 5 per cent. of the cases treated with tartar emetic develop local inflammation varying in severity. Besides this drawback the administration of tartar emetic is generally accompanied by attacks of cough, which may be severe, vomiting, and fainting. Sudden death has also occurred in a number of instances. The complications occurring during the course of tartar emetic have been dealt with in detail by one of us.[1]

As long as there was no efficient substitute, it was imperative to use tartar emetic, and in spite of these drawbacks it has been of great value in Egypt and other countries where bilharziasis is widespread. Attempts were, however, made to find a less toxic antimony compound. The authors, together with their co-workers, have been studying this question in conjunction with the chemical section of the firm of Bayer for the last six years. Ultimately it was possible to produce the present compound which was named "fouadin."[2] This was the seventh of a series of compounds which were rejected either because they were toxic or unstable.

Fouadin is a tri-valent organic antimony compound having the formula expressed as antimony-III-pyrocatechin-disulphonate of sodium (according to H. Schmidt).



It is a white powder containing 13·5 per cent. of antimony. Fouadin is a solution 0·0055 g. of Sb in 1 c.cm.

Course of Treatment.

Nine injections have been found to be efficient to cure the majority of cases. These are given intramuscularly in the gluteal region in the following order for an adult weighing 60 kg.:—

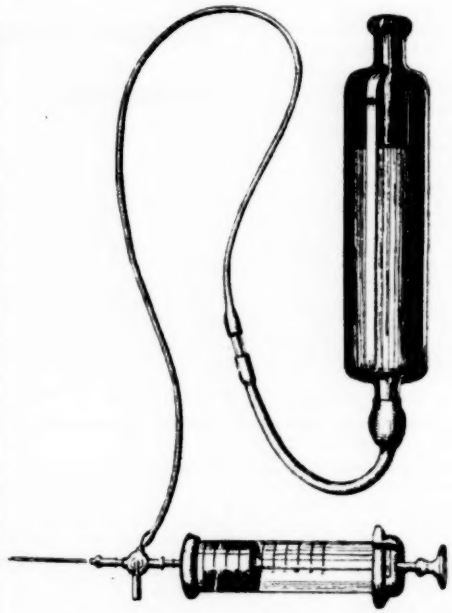
1st day 1·5 c.cm.	5th day 5 c.cm.	11th day 5 c.cm.
2nd ,, 3·5 ,,	7th ,, 5 ,,	13th ,, 5 ,,
3rd ,, 5 ,,	9th ,, 5 ,,	15th ,, 5 ,,

Children or debilitated cases are given proportionate doses according to their weight. The urine is examined after the last injection and if living ova are still to be found it is necessary to give a further one or two injections.

Method of Administration.

The injections are given intramuscularly, preferably in the gluteal region, using the two sides alternately. The drug can be injected into the arms but it is then more painful. The pain lasts for a few seconds and is bearable by children 8–10 years old without crying. The fluid is easily absorbed. X-ray photographs of the site of injection taken at intervals of three minutes demonstrated that the shadow produced by the antimony disappears after six minutes.

For using fouadin on a large scale, the apparatus depicted in the figure was improvised and was found to



Apparatus used for administration of fouadin.

be useful. The syringe is fitted with a two-way tap. One side is connected with a reservoir and the other with the needle. The needle has to be boiled after each injection. To facilitate the work, a large number of needles are employed. It has been found possible to inject 200 cases per hour.

Symptoms and Complications after Injection.

The following table shows the comparative incidence of symptoms and complications after injecting tartar emetic and fouadin respectively. The statistics were based upon 1474 cases treated with fouadin and 311 cases treated with tartar emetic. (Table I.)

TABLE I.

Symptoms.	Tartar emetic.	Fouadin.
Nausea	1·6 per cent.	0·0 per cent.
Vomiting	3·8 ,,	0·36 ,,
Dizziness	0·64 ,,	0·018 ,,
Cough	9·64 ,,	0·0 ,,
Abscess	5·3 ,,	0·13 ,,
Local induration ..	2·4 ,,	0·0 ,,

Owing to the absence of spasm of cough after the administration of fouadin, it was possible to treat cases of pulmonary tuberculosis infected with schistosoma without any risk of hæmoptysis.

Results of Treatment.

The first 215 cases were treated either as in-patients in Kasr el Aini Hospital or at the Anthelmintic Hospital, Kaliub. They were closely observed with a view to establishing the optimum dose and any possible complications.

The drug was later given a trial on a large scale in an anthelmintic hospital. New admittances on three alternate days of the week were treated with tartar emetic and those admitted on the other three days were treated with fouadin. During the period from June 6th, 1929, to August 13th, 1000 cases were treated by either method. Those who refused treatment from the commencement are not included. The methods of diagnosis, estimating the doses and the subsequent supervision, were the same for the two drugs, complying with the routine followed in the anthelmintic hospitals. The results were as given in Table II.

TABLE II.

—	Tartar emetic.		Fouadin.	
		Per cent.		Per cent.
Number of cases	1000	—	1000	—
Total cured	432	(43·2)	686	(68·6)
Cured after 9 injections	0	—	590	(59·0)
,, 10 ,,	0	—	77	(7·7)
,, 11 ,,	0	—	19	(1·9)
,, 12 ,,	330	(33·2)	0	—
,, 13 ,,	50	(5·0)	0	—
,, more than 13 injections (up to 17)	52	(5·2)	0	—
Duration of treatment for those cured (per person)	29 days.		19 days.	
		Per cent.		Per cent.
Not cured after completing the course	51	(5·1)	40	(4·0)
Not examined after completing the course	16	(1·6)	14	(1·4)
Did not complete treatment by absenting themselves	501	(50·1)	260	(26·0)
Refused treatment	176	(14·9)	128	(11·3)

The late results of the treatment may be summarised as follows :—

Fouadin.—Eighty-three cases were re-examined after an interval of one to three months from completing the course of the treatment. Living ova were found in the excreta of two only, and these were both children. Thus the cure is apparently permanent in 97·6 per cent.

Tartar emetic.—During 1922 4014 cases were examined after four weeks from the date of completing the treatment for bilharziasis with tartar emetic. Ova were found in the excreta of 1317—i.e., 32·8 per cent. The condition of the ova as regards its being alive or dead was not indicated. Fourteen children in a waifs' home in Cairo were treated from bilharziasis in 1926 using tartar emetic. Re-examination in 1927 revealed the presence of living ova in four cases—i.e., 28 per cent. Three other cases were passing dead ova.

Fouadin Employed on a Large Scale.

During 1929 fouadin was employed as routine treatment in the Cairo Anthelmintic Hospital during the period of five months on three days of the week. The total number of cases treated up to date was 2041. The result was as shown in Table III.

TABLE III.

		Per cent.
Number of cases	2041	—
Total cured	1552	(61·4)
Cured after 9 injections	905	(44·3)
,, 10 ,,	284	(13·4)
,, 11 ,,	53	(2·1)
,, more than 11 injections	10	(0·5)
Uncured	44	(2·1)
Treated but not re-examined	76	(3·7)
Did not complete treatment by absenting themselves	669	(32·8)
Refused treatment	241	(10·5)

These cases included both sexes. Their ages ranged from 6 to 65 years. One case died on the day following the termination of the treatment. The death was sudden after a collapse. Unfortunately a post-mortem examination was not possible. The symptoms, however, resembled those preceding death during the tartar emetic treatment.

All the cases cited above were cases of *Schistosoma hæmatobium* infection with the exception of 45 who were suffering from *S. mansoni* infection. The result, however, corresponded closely to that of *S. hæmatobium* infection. The treatment with fouadin was carried out at Kasr el Aini Hospital, the Kaliub, Cairo and Damietta Anthelmintic Hospitals.

Conclusions.

A new organic antimony compound, fouadin, has been introduced for the treatment of schistosomiasis. The drug is injected intramuscularly. The abscess formation, cellulitis, &c., which result from faulty intravenous injection with tartar emetic do not occur with this drug. The duration of treatment has been shortensd from 29 days to 19 days. The treatment, unlike treatment with tartar emetic, does not need any special skill in administration. The immediate and late results are superior to those of tartar emetic. A simple apparatus has been introduced to facilitate the employment of this treatment on a large scale in endemic areas.

References.

1. Khalil, M.: Accidents and Complications during the treatment of Bilharziasis by Antimony Compounds, Jour. Egypt. Med. Assoc., 1928, xi., 97.
2. Khalil, M., Nazmi, M. Peter, and others: Die behandlungen der schistosomiasis mit intramuskularen Fouadin injektioen, Deut. Med. Woch., 1929, lv., 1125.

Clinical and Laboratory Notes.

OBSERVATIONS ON THE ÆTIOLOGY OF PSITTACOSIS.

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MEDICAL FIRST ASSISTANT AT THE HOSPITAL.

THE following preliminary note records the result of observations we have recently made at the London Hospital.

Although there is considerable circumstantial evidence that a disease of parrots—psittacosis—is communicable to man, the ætiology of the condition remains obscure.

It is true that in 1893 Nocard [1] isolated a Gram-negative bacillus from the bone-marrow of parrots dead of this disease which he considered to be the causal agent and named in consequence *Bacillus psittacosis*. Subsequent work has shown this organism to be identical with *B. aertrycke*, and though the literature contains instances of the isolation of this bacillus from parrots suffering from psittacosis such a finding has been by no means constant, and in only two instances has it been reported as occurring in cases diagnosed as psittacosis in man (Gilbert and Fournier,[2] Thomson [3]) Nocard's bacillus, being one of the salmonella group, should present little difficulty

[1] Nocard, E.: Conseil d'hyg. du Depart. de la Seine, 1893.
[2] Gilbert, A., and Fournier, L.: Bull. de l'Acad. de Med. 1926, xxxvi., 492.
[3] Thomson, A. P.: THE LANCET, 1929, ii., 115.

in isolation, and further one would expect that infection in man with such an organism would result in unequivocal serological eivdence of its presence; this, however, has not been forthcoming.

We have had the opportunity to investigate 12 human cases diagnosed as psittacosis and six parrots connected with these cases; one of the human cases came to autopsy. In none of these have we been able to obtain any evidence, either bacteriological or serological, of the presence of any member of the salmonella group.

In view of our negative findings and of those contained in the literature we decided to approach the problem from a different angle. It occurred to us as possible that this disease in parrots is caused by a filtrable virus which may under favourable conditions be capable of infecting man. Using the budgerigar as our experimental animal we have been able to demonstrate the presence of a filtrable virus in the organs of a parrot which had been responsible for two human cases. The bird was ill when it reached us, and died in the course of a day or two; bacteriological examination of its tissues gave entirely negative results. Although no quantitative experiments have been carried out our findings suggest that the virus passes readily through Chamberland Li* filter candles and passage in budgerigars with filtered material has been realised. The parrot tissues are still virulent after being kept for 20 days in 50 per cent. glycerol saline in the cold.

Further experiments are being carried out along similar lines with material from other diseased parrots and also from human cases. We are not in a position to say that this virus is the cause of the disease in man, but we consider that our findings suggest that possibility. We are fully aware that the parrot is susceptible to the virus of fowl plague and that we may be dealing with this virus. Experiments designed to determine this point are being carried out.

In conclusion, we wish to express our thanks to our colleagues of the London Hospital, to the Ministry of Health, and to doctors who have kindly put us in touch with material.

HYPERVITAMINOSIS D:

CALCIUM-PHOSPHORUS INTAKE A DETERMINING FACTOR.

BY LESLIE J. HARRIS, SC.D., PH.D.,

DIRECTOR OF THE MEDICAL RESEARCH COUNCIL'S NUTRITIONAL LABORATORY, CAMBRIDGE.

I AM prompted to write the present brief summary of observations to be published in detail later by the consideration that they may suffice to account for the failure of certain workers to reproduce consistently results which have been more readily confirmed by so many others.

Harris and Stewart[1] in 1929 found that administration of excessive vitamin D to rats and rabbits tended to give rise to hyperphosphatæmia and/or hypercalcæmia, a result since confirmed in more extended series of experiments. Since this, as well as the other effects observed, were the opposite of those seen in vitamin D deficiency we concluded: "There are low and high threshold values for vitamin D below and above which there are caused deficient and excessive values respectively of blood-phosphorus and/or blood-calcium and resulting calcification" (Harris and Moore).[2] Now in rickets the primary disturbance is apparently a lowered retention of phosphate or calcium from the gut, with consequent lowering of blood P or Ca, and a resulting deficient "calcification"; and the severity of the condition is largely dependent upon the absolute and relative amounts of these two elements provided in the diet. It was therefore suggested (Harris and Stewart)[1] that the same considerations might also be of consequence in hypervitaminosis D. My present purpose is to mention findings which confirm this idea.

In the first experiment to be described I have fed rats on "synthetic" diets containing a constant known excess of irradiated ergosterol with various graded allowances of calcium phosphate. The results show that the ill-effects produced by the excessive vitamin D (as judged by growth responses, by condition of animals, by extent of calcification and other post-mortem findings, and by histological examinations by my colleague Mr. J. R. M. Innes) are immensely accentuated by any increase of the calcium phosphate and conversely are prevented by a decrease. In another experiment it was found that rats fed on bread and milk in place of the usual "synthetic" rations developed typical hypervitaminosis provided they were given sufficient irradiated ergosterol (0·1 to 0·2 per cent.) and for a sufficient period (e.g., within 45 days). Further, by adding the usual percentage of synthetic salt mixture (rich in Ca and P) to the bread and milk employed as basal diet, these symptoms were greatly accelerated and intensified. (This last experimental result may perhaps explain the recent observation of Prof. Dixon[3] who wrote, "The same experiments made on animals living on an ordinary diet show that the excess of the 'poisonous' food is harmless. For example, certain preparations of irradiated ergosterol given to rats which are being fed on a synthetic diet act as a poison, *but if the rats are fed on bread and milk the effect of the ergosterol is negligible.* In real life we do not live on a completely synthetic diet; nearly everyone takes some if not an abundance of fresh food, so the practical value of this type of experiment may be over-estimated, though it is of considerable academical interest.")

A further point of interest is the possible effect upon the calcium (or phosphorus) retention of changes in the Ca : P ratio of the diet. We found, for example, in experiments concluded about a year ago that rats fed on the high Ca : low P "rachitogenic" diets of Steenbock or of Pappenheim rapidly developed a fatal hypervitaminosis when excessive vitamin D was added.

It is seen, in short, that the occurrence or severity of the hypervitaminosis is determined not only by the degree of vitamin D excess administered and the length of the experimental period but also by the calcium and/or phosphate content of the diet. This observation no doubt accounts for a certain amount of confusion which is evident in the literature; it is of further interest in throwing light on the mode of action of vitamin D in the animal body. It might be added that a fair number of clinical cases of hypervitaminosis (resulting from injudicious use of therapeutic preparations) have now been reported by physicians in Europe and in America, in which the main symptoms are the same as those seen in the experimental condition—viz., high blood P and Ca and excessive calcification. Bearing, too, on these findings is the observation of Miss Elsie Watchorn (in the press) that the hypervitaminosis gives rise to a greatly increased excretion of Ca by the kidney. Direct measurements of Ca and P retention are now in progress. Contrary to the suggestion of A. F. Hess (1928) we find by chemical analysis that there is no loss of Ca or P from the bones to account for the rise in the blood figure.

[1] Harris, L. J., and Stewart, C. P.: Biochem. Jour., 1929, xxiii., 207.

[2] Harris, L. J., and Moore, T.: Ibid., p. 261.

[3] Dixon, W. E.: Nature, 1929, cxxiv., 204.

ACCIDENTS AT SHEFFIELD.—During 1929 the number of traffic accidents dealt with by the Sheffield Royal Hospital was 1152; 358 of the cases were admitted to the wards. The total number of casualties treated during the last three months of the year was 5624, as compared with 4601 in the corresponding quarter of 1928. Of the traffic casualties 75 per cent. were caused by motor-cars and motor-cycles. The 358 patients admitted to the wards spent 6710 days in hospital at an average cost per head of £6 17*s.* 5·39*d.* Of the total costs of £2460, £2199 was recovered.

Medical Societies.

ROYAL SOCIETY OF MEDICINE.

SECTION OF MEDICINE.

AT a meeting of this Section on Jan. 28th, with Dr. R. A. YOUNG, the President, in the chair, a paper on

PSITTACOSIS

was read by Dr. A. P. THOMSON (Birmingham). With the four cases described in a previous communication,[1] he said, the total number he had now seen was 17, of which 5 had proved fatal. As a general statement it was fairly accurate to say of the severer cases that they resembled typhoid septicæmia in retaining a relatively slow pulse despite a high continuous fever. Even before the development of the unusual pulmonary signs, however, certain features distinguished them from true typhoid: the onset was usually more sudden and the temperature rose more rapidly. Headache was intense, generally occipital in situation, and often associated with slight cervical rigidity. Epistaxis had been noted in one patient. Sweating was sometimes severe. Diarrhœa and vomiting sometimes occurred in the early stages, but as a whole, the alimentary symptoms, apart from distension, were trivial. The spleen became palpable in one case and then only for a few hours; no rose spots had been observed. In one case there had been a typhoid-like relapse. The outstanding feature of the clinical picture was the involvement of the lungs. At the onset signs of slight shifting bronchitis appeared, to be followed in a few days by those of extensive consolidation manifested by impairment of the percussion note and the presence of tubular breath sounds. Still later the percussion note became completely flat and breath sounds in the affected area disappeared. This curious silence of the lung might persist for some days after the temperature had fallen and the general condition had improved. A whole lung might be affected in this way. Resolution was very rapid and complete, and was accompanied by fine crepitant râles. Repeated exploration of the chest having shown that these signs were in no way due to pleural effusion, Dr. Thomson concluded that they were associated with obstruction of the smaller bronchi. Confirmation of this opinion was afforded by a post-mortem examination in one of the cases.

Certain negative features in the respiratory condition were important. Although cough was frequent and at times incessant it was never painful, and expectoration was scanty and often absent; only once was any rusty sputum obtained. Respiration was not hurried unless the area of lung involved was very extensive; it was easy and never "pneumonic" in character. Pleuritic friction was never found. Some of the patients had conspicuous nervous signs. Although the clinical course of most of the cases formed a fairly characteristic picture it was clear from a review of the whole of them that the symptoms and signs might be but slight and equivocal—even when the disease proved fatal—and a diagnosis would be frankly impossible unless the history of contact with sick birds was elicited.

Bacteriological Aspect.

The bacteriological findings, said Dr. Thomson, were as yet incomplete, and it would be unprofitable to review them at length. In the earlier part of the investigations a review of such literature as was available had led him and his colleagues to concentrate attention on the discovery of an organism of the typhoid or salmonella type. In the first case a bacillus corresponding fairly well with this group was recovered from a local parotid swelling but in none of the subsequent cases had there been any success so far. A remarkable feature was the recovery of an organism similar in its sugar reactions to *Bacillus fæcalis alkaligenes* from the lung in three cases, and also from the love-bird responsible for the infection of two other cases. Whether or not this organism was responsible in any way for human infection was a problem still under investigation. The results of the agglutination tests were extremely irregular and capricious. In two cases positive agglutination to a typhoid organism were obtained but in nine others there was none. Not much reliance could be placed on positive agglutination with *B. psittacosis* or the salmonella group generally as a means of exact diagnosis, particularly when, as in this series, they were often so transient and variable.

Discussion.

Dr. ROBERT HUTCHISON said he was genuinely grateful to Dr. Thomson for his patient work on this subject, for had it not been for that he would not have recognised the nature of the first case of the kind which came to him in London, since which date he had had considerable experience of the disease. The paper he referred to was Dr. Thomson's contribution to a meeting of the Association of Physicians last spring. Since then he, the speaker, had been in touch with over 20 cases of the kind; four were at present in London Hospital. In the 22 cases there had been, so far, two deaths. The instances of the disease had been enthusiastically investigated by Dr. Levy Simpson at London Hospital. The cases had mostly occurred in house outbreaks—i.e., two to four cases occurring in one family; there had always been a parrot, usually the Amazon green variety. He did not agree with the statement that psittacosis was only found in green parrots; in this series one was a grey parrot. In most of the 22 cases the infection appeared to have been directly from bird to human patient; in one case the patient had not been in close contact with the parrot in question, but she had been in close communication with a sister who had, and had used the same handkerchief. She was now recovering in London Hospital. Apparently the incubation period was about ten days. It was the same condition as occurred in France, where it received the not inappropriate name "pneumo-typhus." When patients were seen the condition looked as if it ought to be typhoid or paratyphoid. In none of his cases was there found the hard dense consolidation of the lung which Dr. Thomson described. In most of the speaker's cases there was an impaired note and medium moist sounds. One patient—who died—had pleurisy, and at the autopsy a condition of pneumonia was described as present. Prof. Turnbull said it was unlike any ordinary pneumonia, either croupous or bronchial. Dr. Hutchison agreed with Dr. Thomson that the diagnosis of psittacosis must always be circumstantial at the moment—the fact of the disease occurring in a house which harboured a sick parrot. At present the bacteriology was vague and indeterminate. There was a good deal of psittacosis at present in London; in response to a letter from himself in the medical journals he was told of four additional cases, and probably cases were being overlooked. Last July a bad outbreak of the disease took place in the Argentine Republic, whence many of the birds had been brought to Europe, but a knowledge that such an epidemic occurred had only slowly filtered across the Atlantic. No cure had been found for the fully developed disease. In Germany the importation of parrots had been forbidden; England was attempting to protect herself by imposing quarantine on these birds. To be effective it seemed that this period of quarantine must be a prolonged one. Perhaps the Ministry of Health would investigate the matter.

Dr. E. STOLKIND spoke of two patients under his care whose symptoms pointed to psittacosis, though both made a complete recovery. He found in one case that the parrot being kept in the room was obviously ill, and he ordered its removal, but this was

[1] THE LANCET, 1929, ii., 115.

not carried out until two days later. The parrot died, and the chief cause of death was enteritis. He referred to the report of an epidemic of psittacosis in a provincial German town in the summer of 1899, when there were 26 cases and 6 deaths, the youngest patient being 13, the oldest 69. In all the cases there was a severe pneumonia, but no sputum and but slight cough. The disease ended by lysis. In none of the cases could the spleen be palpated. The incubation period in those cases varied between 2 and 13 days.

Dr. G. T. WESTERN spoke of a case which was investigated bacteriologically and serologically by him both during life and after death, and the result was negative. Only twice had the bacillus been isolated from human cases. Possibly a filter-passing virus might be the cause of this disease.[1]

Dr. S. P. BEDSON also thought the negative bacteriological findings suggested that the disease was due to a filtrable virus. A sick parrot had been secured, and attempts made to transmit the disease to another kind of bird equally liable to it, and the love-bird was chosen. He started with a parrot which was known to have caused two human deaths, but culturally it was negative. But an emulsion of spleen, liver, and intestine from this parrot when injected into a love-bird, filtered and unfiltered, caused death in that bird in five days. The work was still in progress. The filtrate was resistant to glycerol.

Dr. LETHEBY TIDY submitted that it was not possible to dismiss the probability of the aertrycke bacillus being responsible for these cases of acute and serious illness derived from parrots; it was the organism which had been isolated on several different dates. Admittedly the serological results were very variable: one case would give a high agglutination, and the next case perhaps none. Among 100 cases, though it was clear they were infected with the aertrycke bacillus, the bacillus could be isolated only in one. Psittacosis could not be held to be disproved unless some other cause was definitely found.

Dr. MACNAMARA said that on Dec. 21st last his two small boys were presented with a parrot. It was in a dilapidated condition, which was attributed to the fact that it had come by rail insufficiently protected. It died later in December. Three persons had had to do with the bird, and they fell sick and died in January. They had not, however, the pronounced pulmonary symptoms which had been described. A nephew had come to stay at the house on the afternoon of the day the parrot died (it was removed to an outhouse after death). This nephew developed psittacosis on Jan. 9th; he had not been in contact with the parrot. His gardener, who cleaned out the cage and removed the bird's body, developed psittacosis on Jan. 10th. It was remarkable that, so far, the boys to whom the parrot was presented had not developed any symptoms of the disease.

Dr. LEVY SIMPSON remarked that the dried fæces of the parrot containing the infecting agent could be disseminated as dust. In most of the London Hospital cases the incubation period was ten days. Histories of cases seemed to show that the longest incubation period recorded was 21 days. It seemed clear that sick Argentine parrots were directly responsible for the European outbreaks. He referred to a Paris outbreak which followed the purchase of 500 Argentine parrots, 300 of which died on the voyage.

The PRESIDENT expressed high commendation of Dr. Thomson's work in this matter, for which the profession was greatly indebted. It would have far-reaching results, not only in preventing the disease, but perhaps towards working out a valuable treatment.

Dr. THOMSON, in reply, pointed out that the lack of uniformity of symptoms in cases might well mean that more than one kind of infecting agent was at work.

[1] A note on the observations of Dr. Bedson, Dr. Western, and Dr. Levy Simpson appears among our Clinical and Laboratory Notes (p. 235).

Dr. OTTO LEYTON read a paper on nine cases of

RECOVERY FROM DIABETES MELLITUS.

He defined diabetes as "a disease due to a progressive deterioration of the metabolism, primarily of that of carbohydrate, and secondarily of that of protein and fat." He diagnosed hyperglycæmic glycosuria (in the absence of symptoms) as diabetes mellitus only when there was conclusive evidence that the loss of the power of storing sugar was progressive. He considered that a patient had made a complete recovery when he had been eating ordinary food for at least six months and had not at any time developed glycosuria, although he was not receiving any drug calculated to assist metabolism or to delay absorption. In these nine cases he purposely used the word "recovery" rather than "cure," because he did not wish to assume that the treatment was responsible for the return to health. All his patients, he said, had received enough food to satisfy their appetite, and most of them enough to allow a gain or at least a maintenance of weight. None of them had received alcohol. Evidence had recently been accumulating to prove that alcohol retarded regeneration of the pancreas, and acted in a way somewhat parallel with chloroform and ether, although not so potent. The nine cases related were private ones; it was essential that the patients should be intelligent and scrupulously obedient. He described each case in detail.

Dr. P. J. CAMMIDGE remarked that there was not yet any general consensus of opinion on the meaning of diabetes mellitus, and he thought it would be well for medicine in general if some important body, such as the Section, could make a declaration on nomenclature, so as to secure uniformity of definition. There were other causes of hyperglycæmic glycosuria besides diseases of the pancreas; for many years he had contended it was a fallacy to hold that because a patient had excess of sugar in his blood and sugar in his urine there was necessarily some defect in his pancreas. All the cases now brought forward by Dr. Leyton were in elderly people; omitting the one child, the average age was 51, and four of the nine had a family history of diabetes. It seemed that their difficulty was largely one of storage of carbohydrate, any defect they might have in burning sugar being quite secondary. Cases of this kind readily responded to treatment. He thought Dr. Leyton took a somewhat gloomy view of dietetic treatment. The speaker had had 33 cases of recovery from diabetes within the definition given by Dr. Leyton, and 26 of those were treated by diet alone, 7 by insulin. One of his cases was that of a man aged 37, who came with a blood-sugar figure of 680, and was passing 476 grammes of sugar in his urine on a test diet which contained 100 grammes, showing that he was breaking down his own tissues at a serious rate. He was treated entirely by diet; within a month the blood-sugar had gone back to normal; and he remained sugar-free for six years, as shown by periodical examinations. Then he took to drink, and in a short time the blood-sugar went up; he developed a carbuncle, and died of diabetic coma.

Dr. GEORGE GRAHAM agreed that Dr. Leyton's patients had diabetes, but he would not apply the term "recovered" to them. It was important to give patients insulin early, to allow them a chance of recovery.

Dr. R. D. LAWRENCE also objected to the term "recovery" being applied to these nine cases; none of them complied with the requirements the reader himself laid down. The results, however, were encouraging.

Dr. E. P. POULTON asked whether Dr. Leyton had any explanation of the fact that the sufferers from this disease under his care had shown this improvement only since 1927; had he been using the oil preparation for all these patients? Usually one wished insulin to have its effect during a meal, and it was desirable to give it a short time before a meal.

Dr. LEYTON, in a brief reply, said these cases had not been treated with oil suspension; the treatment

came too late for them. As to whether these cases could be said to have recovered, he contended that they had done so within the meaning given to that word in the Oxford Dictionary. It was a return of the patient to the condition he was in before he had the disease. If at the end of the treatment the patient could eat and drink ordinary food in unlimited quantity for six months, either a new word must be coined to fit the case or "recovery" must be applied. The fact that the patient might still have an undue liability to develop the disease did not preclude the use of the term in diabetes any more than it would in pneumonia.

SECTION OF UROLOGY.

AT a meeting of this Section on Jan. 23rd, with Mr. FRANK JEANS, the President, in the chair, a paper on the pathology and treatment of

CARCINOMA OF THE PENIS

was read by Mr. A. CLIFFORD MORSON. He prefaced the paper by demonstrating several cases.

The first patient, aged 70, had had phimosis since birth. Last May he attended hospital with a cauliflower growth on the glans penis, which was covered by the prepuce. It was a papilliferous carcinoma. A contact cancer was growing from the prepuce, in the region of the frenum. The patient was circumcised, and radium needles were inserted into the growth. There were enlarged glands in both groins, and the urethral opening was completely obscured by the growth. When seen a week ago there were no enlarged glands in either groin, nor any sign of growth, though the skin near the frenum looked sore, probably because of rubbing of the clothes on a surface which had always been covered by the prepuce. Except for high blood pressure—which was being treated—the man was now in good health. The growth was painted with 2 per cent. fluorescein.

Another patient, aged 41, was first seen last April. He had a cauliflower growth the size of a tangerine orange surrounding the whole of the glans penis; there was also an offensive discharge, and he had high fever and enlarged glands in both groins. The urine was passed in several small streams through the growth. Nine years ago the patient was treated for a wart on the penis. The condition last April looked so bad that Mr. Morson doubted whether he ought to use radium, but the superintendent of the hospital urged him to do so. Radium was therefore applied, and the growth shrank astonishingly. Six tubes of 5 mg. each were inserted, at a distance of 2 mm. from each other, for 24 hours, and the position of the tubes was afterwards changed periodically. The man had a high fever and was very ill. A month after the radium treatment was started there was no longer any fever, and the glands were scarcely palpable. The glans penis was almost entirely destroyed, except for the part which was attached to the penis by its pedicle.

A third patient, aged 73, was first seen in April, 1923, when he had a large growth on the penis, and the urine was passing through several openings along the course of the urethra. There were hard and nodular glands in both groins, and he had fever. The Pearce-Gould operation of complete amputation was performed, and when the patient was seen a week ago there were no glands palpable in the groin, and his general health was excellent. He had a narrowing of the external meatus, and it required the passage of a No. 15 (French) bougie once in three weeks. A fourth case was also shown in which treatment had been the same as in the first two, and the results had been equally good.

For half a century, Mr. Morson said, it had been known that malignant disease of the penis commonly occurred in men having a long prepuce, and that sepsis readily supervened, with glandular enlargement in one or both groins. What were the ætiological factors? It had been said that the condition could not arise in those who had been circumcised: but the speaker had himself performed partial amputation for a growth of the glans in a man with no prepuce. Certainly the retention of smegma set up inflammation which, if unrelieved before middle life, must predispose to cancer formation. A. L. Dean (New York) had studied 75 cases in men from 21 to 79 years of age. There were no Jews in the series, and 60 per cent. gave no history of venereal disease. Warts on the penis were certainly the result of sexual intercourse, and equally surely were forerunners of the papillary type of carcinoma. It was an example of a simple new growth passing into malignancy. Warts of the penis were commonly multiple, and so was papillary carcinoma. The ulcerative variety was no tumour in the sense of an outgrowth of tissue, but an ulcer which, if untreated, would eat away the whole organ. What factors produced this deadly phenomenon? Did venereal disease play any part? There was no evidence that it did so, as there was in the papillary form; but he knew of no such case in which either decomposition or smegma or phimosis had not been present. The papillary type was preceded by the appearance of venereal warts, and here phimosis did not necessarily play a part. The predisposing causes in the ulcerative kind were phimosis and decomposition of smegma. The causal agent was a mystery in both, but in both dirt was a most important agent; those who practised personal hygiene were immune from this disease.

Penile cancer was very chronic, extending for years before advice was sought; it was the onset of sepsis that took the patient to the surgeon. Until then there appeared to be no pain, loss of weight, or discomfort. Infection caused obvious enlargement and tenderness of the glands in the groin; fever began and wasting was noted. In Mr. Morson's experience the migration of the malignant cell from the primary lesion to the glands of the groin was delayed until the cancer could be regarded as having passed the initial stage and reached the time of commencing infection. The glandular increase was due to adenitis, not to malignant metastasis. Sepsis in the presence of cancer was peculiarly virulent, and was the principal cause of death. He had seen cavities in both groins large enough to hold a tangerine orange, and these were filled with a most offensive discharge. Death was often due to very severe hæmorrhage, or occasionally to septic broncho-pneumonia.

In this country carcinoma of the penis was rare, and in 18 years he had not seen more than 25 cases of it. It seemed to be more common in America. Walther stated that penile cancer was three times as prevalent in the negro as in whites, a statement confirmed by French writers, though without any attempt at explanation. Usually the disease appeared between the fourth and sixth decades. C. P. Howse stated that in his series the inguinal glands were involved in 94 per cent.—either by infection by sepsis or by carcinoma; but the speaker would not place the proportion at more than half that. He agreed with Barringer that invasion of the groin glands by carcinoma was rare, while infection without cancerous involvement was common. As soon as sepsis invaded the adenoid tissues in the inguinal region, the patient's condition steadily deteriorated; fever was continuous and cachexia decided. Retention of urine did not occur, for there were multiple openings through which the urine trickled.

Malignant melanoma or melanotic carcinoma occasionally attacked the penis, taking origin in a pigmented mole or wart of many years' standing.

Treatment.

In 1882, said Mr. Morson, the late Sir Alfred Pearce-Gould described a technique for amputation of the whole penis with removal of the crura, bulbo-cavernosus muscle, and glands in both groins. In 1912, in Paris, tubes of radium were placed in the growth, and to-day a concentrated effort was being made to banish the knife in favour of the radium needle. In performing partial amputation it was important to make a posterior or ventral flap, so as to prevent urine trickling over the wound; and a considerable length of urethra should be dissected out distal to the point of division of the corpora cavernosa, so as to permit of retraction. The main disadvantage was the total loss of the organ. If the operation was properly performed, there need not be recurrence. If infection was limited to adenitis, the word "cure" could justifiably be applied.

As regards radium irradiation, two methods were available: the use of a Columbia paste cap, to hold the radium containers, over the whole growth, left in position one to ten days; or (Mr. Morson's own

method) the use of platinum needles with an over-all length of 22·5 mm., each containing 5 mg. of radium, buried them at such distances apart as, it was hoped, would produce homogeneous irradiation of the growth. At first the radium was left in place for 24 hours, and then subsequently for 36 hours, at a time, because the resistance of the malignant cell to irradiation increased if its nucleus was not destroyed at the beginning of the treatment. The complications in this method were difficulty in micturition, caused by œdema of the urethral mucous membrane, sloughing—the result of over-dosage—and stricture of the external meatus. Opinions differed about the treatment of inguinal lymphatic glands; he himself did not operate upon these nor irradiate them unless the skin over them had ulcerated, for if the squamous cells of a penile cancer had entered the inguinal glands they would not go any further, while if the primary growth had been irradiated, these cells would not multiply, but would be ringed round by a defensive fibrosis. By irradiation the penis was preserved, and though stricture of the external meatus might sometimes result, its frequency was not comparable to that observed after amputation.

Mr. Morson's conclusions were briefly as follows. In both papillomatous and ulcerative varieties of penile cancer the growth could be made to disappear, but there was no guarantee of cure. The moral effect of removing the tumour while retaining the penis rendered irradiation the method of choice. Recurrence could be met by further irradiation and health could be so much improved that the patient could stand a Pearce-Gould operation if necessary. If most of the penis had already been destroyed, total amputation was the correct treatment.

Discussion.

The PRESIDENT said he had not treated carcinoma of the penis with radium, but he agreed that the psychological effect of retaining the penis was important. He hoped Mr. Morson's statement that epithelial carcinoma was stopped by the glands was true.

Mr. F. FOWLER WARD (Ipswich) said that on looking up his cases of cancer of the penis in the last ten years he found in none of them had the growth recurred. One patient had died of what appeared to be a secondary effect in the lung. The only immediate fatality he had had was one in which the femoral vein was torn, death following from hæmorrhage in 30 minutes. He was much impressed by what Mr. Morson had said about the use of radium in these cases.

Mr. ERIC PEARCE-GOULD considered that in the future there would be no need to inflict on patients the full horrors of the radical operation. His last case was treated with radium, and the result was very satisfactory.

Mr. FRANK KIDD discouraged belief in a cure of these cases by radium. In performing the Pearce-Gould operation he had never had difficulty with sepsis, nor was there stricture of the urethra. He was not aware of his patients having had inferiority complexes; they seemed happy and comfortable. A much longer period should elapse than Mr. Morson had mentioned before speaking of cures by radium.

Mr. R. H. JOCELYN SWAN did not think Mr. Morson claimed to have brought about cures, but he indicated the progress which had been made in treatment. He objected to Mr. Morson's statement that the cells having got to the inguinal glands they went no further; he could produce evidence to the contrary. He would prefer to use a small dose of radium over a longer period than a larger dose for a short time, and he would concentrate the irradiation as a barrage at the growing edge. The epithelial type of new growth was well fitted for treatment by radium.

Mr. H. W. S. WRIGHT spoke of the prevalence of penile cancer and warts and phimosis in China. Most of the cases of cancer of the penis which he saw there were of the cauliflower type. He treated them by an operation approximating to that of Pearce-Gould. He had only one death, and that was due to septicæmia.

Mr. MORSON, in his reply, said he had seen a considerable number of cases of carcinoma of the penis in which the primary lesion was in the prostate, and in most of the cases where metastases were found, other than in the inguinal glands, the primary lesion was in the prostate, not in the penis.

MEDICAL SOCIETY OF LONDON.

AT a meeting of this Society on Jan. 27th, with Mr. DONALD ARMOUR, the President, in the chair, a paper on the

ÆTIOLOGY OF GALL-BLADDER INFECTIONS

was read by Prof. D. P. D. WILKIE (Edinburgh). To some it might seem presumptuous, he said, for a surgeon to enter on discussion of this subject, but present-day knowledge of the gall-bladder was largely due to the observations of surgeons. So commonly was this organ diseased, and so often were stones present in it, that the pathologist was apt to discount its importance, while post-mortem changes took place in it so rapidly that early lesions might readily be missed. Numbers of patients were operated upon because they had had a chronic flatulent dyspepsia associated with some ill-health—apart altogether from biliary colic—and in many of these cases, although there were no stones in the gall-bladder, there was a definite change in its wall. Cholecystectomy had been found to give relief, not only to the flatulent dyspepsia, but also to other symptoms, and gradually the idea had been evolved that the gall-bladder might not only be the seat of inflammation, causing local symptoms, and of stone formation, causing colic, but that it might also be a focus of infection affecting other parts of the body.

The gall-bladder was a concentrating organ; it concentrated bile ten times in the course of 24 hours, both the pigment and the salts. And the important question arose whether it possessed the power of spontaneous contraction, and whether it could empty itself by means of its own musculature. Prof. Wilkie thought it could. Ivy, of Chicago, had shown that from the upper part of the small intestine one could isolate a gall-bladder hormone, a purified secretin, which, when injected intravenously into animals, caused the gall-bladder to contract.

Cholecystitis and Gall-stones.

What was the origin of cholecystitis? Did it always precede gall-stones, or did gall-stones precede it? There was a good deal of evidence that certain types of stone might form independently of any infection, and particularly the pure radiate cholesterol stone, which was usually single, ovoid, opalescent, and was found in a gall-bladder which was not thickened and was unassociated with a history of previous febrile attacks. Sometimes this received the name of "metabolic" stone, as it was supposed to be laid down because there was an excess of cholesterol in the bile and some stasis in the gall-bladder. It produced an afebrile colic which was intermittent, and inaugural symptoms due to cholecystitis were absent. At any time such a stone might be impacted in the neck of the gall-bladder and cause an attack of biliary colic. In such an event the gall-bladder filled with mucus. The stone might remain impacted and leave the patient with a mucocele of the gall-bladder, or it might fall back again as the tension diminished. The pure pigment stone was not often seen, but was typically associated with acholuric jaundice; it was not associated with cholecystitis, even at a later stage. The septic, faceted stone, which had a cholesterol centre and laminæ of cholesterol and calcium, might appear secondarily to a primary stone, or might form independently.

Primary infection of the gall-bladder, went on Prof. Wilkie, was undoubtedly very common; Graham, of St. Louis, thought that 35 per cent. of the adult population had some degree of infection of the organ.

The route by which bacteria reached the gall-bladder had been much in dispute. Many were taught that infection travelled from the duodenum, up the bile-duct, and so to the gall-bladder, duodenal catarrh being a predisposing factor. Some thought it came down from the liver in the bile stream, but most of the evidence was against this suggestion; if 40 c.cm. of an emulsion of *Bacillus coli* was injected into the portal vein of an animal, it could not be recovered from the gall-bladder on the following day. It was, as a matter of fact, difficult to infect, from the lumen, any hollow viscus which had undamaged mucous lining. Graham brought forward strong reasons for thinking that infection travelled from the liver to the gall-bladder, and that hepatitis preceded the cholecystitis, but there was now evidence that this was not the usual route of infection. At one time it was thought that typhoid infection was the most potent cause of cholecystitis, and it was true that typhoid did infect the gall-bladder, and that a patient might have a chronic typhoid cholecystitis for many years. That was not the common type, however, in Prof. Wilkie's opinion. In his own series of 650 cases—almost all of which had been examined bacteriologically—there had not been a single one of typhoid infection. Both colon and typhoid bacilli could flourish in bile, and from many infected gall-bladders the former could be recovered. What struck him and his colleagues most in examining gall-bladders was the number of cases in which there was neither a growth of organisms in culture nor the ability to demonstrate them in microscopical sections. Extending the series, a number of cases were found in which chains of micro-organisms were demonstrated, though culture from the gall-bladder wall was sterile. The work had been continued during the last 3½ years, and the results had been fairly consistent; they had been able to grow a streptococcus from 32 per cent. of the cases, and *B. coli* in 14 per cent. It was safe to say that just over half these gall-bladders gave a positive growth of streptococcus. Success in this work began when only a small piece was taken for culture, avoiding the mucous membrane, and particularly when the cystic lymph gland was used. Even then, however, the result was negative, unless the gland was removed at the end of 4 to 6 hours. For the organism would not grow if there were autolytic products, or if there was much bile in the medium.

Prof. Wilkie showed the following Table which showed, he said, remarkable difference in the incidence of hospital and private cases.

Gall-bladder Cases, 1919–29.

—	M.	Av. age.	F.	Av. age.	Total.	Av. age.
Hospital ..	61	48	298	46	359	46·5
Private ..	92	56	207	51	299	53
Total ..	153	—	505	—	658	—

M = male; F = female; av. = average.

Operations.

—	Ch.	Died.	St.	Died.	Per cent. mortality.
Hospital ..	266	6	59	1	2·1 } 2·73 av.
Private ..	186	6	86	5	4·04 }

Ch. = cholecystectomy. St. = cholecystostomy.

Medical and Surgical Treatment.

The investigation, he said, had altered his conception of cholecystitis, for he believed it was, in the majority of cases, a blood-borne intramural infection of the gall-bladder, and therefore difficult to eradicate. The only medical means of doing so seemed to be to raise the general resistance of the patient to the organism, or if possible, to give some drug which was absorbed by the gall-bladder; the surgical alternative was to remove the infected organ in which streptococci had become located. This knowledge meant that the operation of choice was not drainage of the gall-bladder, but removal of its infected wall. A criticism sometimes heard was that people were not well after their gall-bladder had been removed, and he knew of several people who complained of symptoms after cholecystectomy. But where such cases had been investigated properly, and especially if they had been operated upon again, some cause had been found for the residual symptoms: a stone previously unnoticed had been left behind, or there was pancreatitis, or a coincident ulcer had been missed, or appendicitis, or even unrecognised malignant disease in the colon. Could one hope, by ordinary drugs, to affect beneficially a lesion which was intramural? Prof. Wilkie still was doubtful about that. When secondary infection of the colon was present considerable benefit could be got by medical biliary drainage or by giving certain drugs, such as urotropine; but for the chronic indolent type of streptococcal intramural infection very little could reasonably be expected from drugs, and if the condition was persistent and disabling, operation was the only rational treatment.

Discussion.

IN seconding a vote of thanks proposed by Mr. V. WARREN LOW, Mr. HERBERT CARSON remarked that this recent work left no alternative to the conclusion that at present the right treatment of chronic cholecystitis was surgical.

Mr. A. J. WALTON said his own experience of this subject had been mainly clinical, but it largely accorded with what Prof. Wilkie had established from the pathological side. He thought the cholesterol gall-stone was always due to inflammatory change. He had found that the pure cholesterol stone was always single and relatively small and amorphous in its outer layers. If Aschoff had been correct, cholesterol stones would have been found as a crystalline formation. He agreed with Bland-Sutton that crystallisation was always a secondary change. He, the speaker, had had 23 cases in which there were pure cholesterol stones; 5 of them had acute, and 18 chronic, cholecystitis. He had not seen such a stone in any case in which there was no evidence of cholecystitis. In his opinion Prof. Wilkie was right in thinking that gall-bladder infection was always blood borne. The gall-bladder lesion was the residue of a mild septicæmia. Many cases came with inaugural symptoms which were those of a general infection; they came to hospital with what was called influenza or pyrexial conditions, with pain. They were treated, but began to develop dyspeptic symptoms, and later they had tenderness over the gall-bladder passing on, perhaps, to cholecystitis. If left alone, the case became one of gall-bladder trouble.

Dr. J. W. MCNEE said his work made him believe that cholesterol stones occurred in gall-bladders which were not infected, and whose walls were not infected. Recently he had had the opportunity of testing Prof. Wilkie's conclusions on the bacteriology of the gall-bladder, and in most of the cases he had examined the gall-bladder contents were sterile. He had not, however, been able to examine the bacteriology of the gall-bladder wall, like Prof. Wilkie. What could be done from the medical standpoint to prevent to some extent the formation of gall-stones in cases of chronic cholecystitis was to use simple duodenal drainage, or to give concentrated magnesium carbonate by mouth in the early morning so as almost to empty the gall-bladder. The normal means of emptying the gall-bladder was the introduction of fat through the pylorus into the duodenum. Though he had seen many operations in this region, he had never seen a gall-bladder completely empty. He was sure that there were a fair number of cases of chronic typhoid and paratyphoid infection of the gall-bladder going about. A pure culture of typhoid bacilli might be obtained at operation twenty years after the initial infection. From the point of view of the physician, if the commonest variety of chronic cholecystitis was due to an intramural infection, he did not see how it

could be expected to be curable by medical means, except by increasing the patient's resistance. But much could be done in preventing gall-stones, either by biliary drainage—which was more simple than many imagined—or by the use of such a tube as he passed round for inspection.

Dr. H. W. CROWE said he was glad to hear that Prof. Wilkie and his collaborators had succeeded in growing streptococci from the wall of the gall-bladder in these cases, also from the cystic duct; he had often tried himself, but without success. A woman patient of his with rheumatoid arthritis developed a very acute gall-stone colic, and when he examined her fæces after giving magnesium sulphate he found an almost pure culture of streptococcus. It was the kind which almost always caused rheumatoid arthritis in the rabbit, and it attacked the marrow of the bones more than the articular ends.

Prof. WILKIE, in reply, said he was inclined to agree with Mr. Walton that the cholecystitis was a residuum of a general infection, what could be called a septicæmia. The only occasion on which he had seen a completely empty gall-bladder was in a patient who had a tumour at the junction of the two hepatic ducts. In five cases he had found *B. welchii;* three were acute cholecystitis cases of the gangrenous type, and they had the marked pallor seen during the war in patients suffering from gas gangrene. He had not found arthritis in the rabbits studied in the series. A careful study of tonsils revealed a large number harbouring *Streptococcus viridans*, and when this was injected into rabbits it caused definite cholecystitis in three.

LONDON CLINICAL SOCIETY.

AT a meeting of this Society held at the London Temperance Hospital on Jan. 28th the chair was taken by Mr. HERBERT PATERSON, and Dr. ARTHUR HURST opened a discussion on the

TREATMENT OF GASTRIC ULCER.

Medical treatment was, he said, handicapped at the start by tardy diagnosis. The average duration of the symptoms before treatment was about ten years. Better and earlier diagnosis depended upon the general practitioner. Indigestion that did not disappear rapidly on the application of simple measures was probably due to organic disease; if the nature of this disease was in doubt, the general practitioner should seek the help of a first-class radiologist. No gastric or duodenal ulcer would escape a radiologist with the necessary experience. Since X rays did not distinguish between an active and a healed duodenal ulcer, a biochemist should be requested to examine the stools for occult blood. A test-meal was a good auxiliary, but of less importance. Dr. Hurst believed that the pathogenesis of peptic ulcers lay in a diathesis; cases with many ulcers in the family history were the most difficult to deal with. The essential factor was the presence of free acid. Ten per cent. of all persons were born with a tendency to hyperchlorhydria, and the site of the ulcer depended upon the anatomy of the digestive organs. The exciting cause might be infection, most commonly from the mouth and less commonly from the throat, gall-bladder, and appendix. Of accessory exciting causes, especially of duodenal ulcers, the commonest was smoking, which increased the tendency to hyperchlorhydria; others were indigestible food and alcohol.

Though medical and surgical treatment were not opposed, surgical treatment was only indicated in perforation and permanent mechanical obstruction. In the absence of these conditions, medical treatment, if sufficiently strenuous and prolonged, would always cure even the largest ulcer, but patients should be prepared for a stay in bed of not less than four weeks and possibly of eight weeks. No measures should be relaxed until all spontaneous pain, tenderness, and rigidity had gone; until the most delicate test failed to detect occult blood in the stools, and until the X rays showed no signs of a crater. This criterion required at least four weeks, and an extra week should be allowed for safety. The second most important principle was to remove all septic foci; this demanded the help of the appropriate specialists. Finally, the patient must continue to observe the precautionary rules for the rest of his life.

Medical Treatment.

The basic principles of the method employed by Dr. Hurst were, he said, the avoidance of free acid and of mechanical irritation. The best means of avoiding free acid was to give hourly feeds of five ounces of milk or its equivalent through a tube; change of diet was introduced to avoid monotony. Drugs were of two classes: those which prevented the secretion of acid, such as olive oil, and those which neutralised it when formed, such as atropine; the latter was very valuable and was given in commencing doses of gr. 1/200, increasing to correspond with tolerance. Dr. Hurst's views on alkalis, he said, were unorthodox. Bismuth carbonate was not an alkali; sodium bicarbonate gave off carbon dioxide and caused undesirable distension, and, if given in excess, provided a most powerful stimulus to gastric secretion. He used sodium citrate, which also prevented milk from clotting; oxide of manganese, the dose of which could be regulated to keep the patient's bowels open; and the tribasic phosphate of calcium or magnesium—chiefly the former—which effectually prevented acidosis.

Cases with a certain amount of pyloric obstruction only required operation if the condition persisted after a fortnight's treatment. In addition to the routine, the stomach was emptied last thing at night; it was always found to be empty next morning. Even if operation were required, the treatment much improved the prospects of success by restoring the tone of the stomach. There was no danger of any ulcer becoming malignant except the rare prepyloric class; these should always be treated surgically.

Surgical Treatment.

Mr. H. S. SOUTTAR agreed on the propriety of medical treatment in every case which was diagnosed when it should be, but said that few were. He quoted the statistics of surgical results published by the British Medical Association to show that 90 per cent. of cases were virtual cures; similar success had, he said, been achieved by Lord Moynihan, the Mayo brothers, Mr. A. J. Walton, Mr. Paterson, and himself. Operative treatment was no longer as serious a matter as it had been. A duodenal ulcer or a gastric ulcer in the neighbourhood of the pylorus was relatively easily dealt with by gastro-duodenostomy; for large ulcers involving the pancreas he relied on partial gastrectomy. Technique had been revolutionised by the introduction of local anæsthesia. He infiltrated the rectus sheath, made a mid-line incision, and injected the peritoneum on each side; then he raised the liver, passed the needle back into the retroperitoneal space and flooded the splanchnic area with about 60 c.cm. of ½ per cent. novocain. These injections took about four minutes and saved a great deal of time, and the patient was completely protected against any shock. Long and difficult operations for jejunal ulcer could be carried out entirely under local anæsthesia, and the patients escaped the usual after-effects. The economic advantage was heavily on the side of surgery, because the patient could go into the country a fortnight after gastro-enterostomy for duodenal ulcer and be back at work far sooner than if he had relied on medical treatment. Moreover, after about three months' moderately careful dieting he could, within any sort of reason, do what he liked. If a patient had to remain on diet for longer than that time, Mr. Souttar did not regard him as cured, and the real test between the physicians and the surgeons was what each meant by cure. There could be no doubt which was the most convenient method. The patient who had ample time and could afford to go in for careful dieting could allow himself the luxury of medical treatment, but the patient who realised that he had only one life and wanted to live it would prefer surgery.

Dr. ADOLPHE ABRAHAMS adduced against surgery the deplorable results of failure, which occurred even in the hands of the most capable surgeons. Surgery had the advantage when time was the most important factor, but could not cure the diathesis and therefore could not guarantee a cure.

Duodenal Feeding.

Dr. ERNEST YOUNG described Einhorn's method of duodenal feeding, which had now attained wide recognition in this country. A fine rubber tube was passed into the duodenum and retained for an average time of three weeks. The patient was fed every two hours. The keynote of the treatment was rest; the stomach was spared work and no food passed over the surface of the ulcer. The tube was easy to insert if it were simply passed into the stomach up to the 23 cm. mark, and the patient told to swallow it every ten minutes. The standard feed was an egg in 8 oz. of milk and 1 of lactose, but Dr. Young varied it with 8 oz. of Benger's Food and a teaspoonful of cream. Patients tended to gain in weight. The tube caused no discomfort after the second day at longest, and the pain of a gastric ulcer ceased after the first day. The pain felt in certain cases of duodenal ulcer was relieved by a dose of alkali after each feed for a few days. Liquid aperients were given when necessary, and severe anæmia was treated with injections of iron and arsenic. Patients were allowed to get up for toilet purposes and baths and when their beds were made, and there was little weakness after the three weeks. When the tube was removed a carefully graduated solid diet was commenced. The method was suitable for all cases of gastric ulcer except hour-glass stomach and those in which the X ray revealed pyloric obstruction. Duodenal ulcer took longer to cure by this means than by surgery, but the patient with even a large gastric ulcer could be back at work in five weeks. In after-treatment Dr. Young held a middle course between Dr. Hurst's views and Mr. Souttar's, putting his patients upon a carefully chosen but full diet.

Mr. W. H. A. DODD asked Dr. Hurst the correct treatment for perforation; whether after suture his normal régime was followed. He also inquired if any technique existed for passing a stomach tube painlessly.

Dr. JOHN REID confirmed from his practical experience the value of Einhorn's method. Of 25 cases treated, 24 were employed at active work after two years; none of them were people who could study their diet, and he regarded them as cured. The average increase in weight during the three weeks was 7 lb. A strong point in favour of the duodenal tube was that, if a second tube were kept in the stomach and the food introduced very slowly into the duodenum, the gastric secretion and acidity were steadily reduced, and after a fortnight it was practically impossible to obtain any free hydrochloric acid. He believed in withholding solids for a few days after the removal of the tube, and then introducing them gradually. He did not think that recovered patients could eat anything and everything, and warned them to "gang wary" and do everything they could to prevent recurrence of their ulcer.

Dr. J. J. SPIRA said that neither line of treatment was based upon the ætiology, which was unknown. Some cases with no hyperchlorhydria did well on alkalis, which must therefore have some other action besides that of neutralisation. Experiments showed that ulcers could be caused by innumerable agencies. He asked whether the chronic and the acute ulcers were identical. The high incidence, according to Dr. Hurst, could not be entirely due to a constitutional factor, but some factor must exist which turned an acute ulcer into a chronic one. Acute ulcers, with their sudden onset and virulent course, showed all the signs of a toxic or acute infective cause and of a systemic origin; chronic ulcers submitted to the usual evolution of chronic inflammatory processes and depended upon some unknown source of local irritation which was not due to hydrochloric acid nor to the ulcer itself. Research along these lines might reveal the factor which produced chronicity.

Dr. P. FOWLIE asked the correct treatment of jejunal ulceration following gastro-enterostomy. He deprecated any further surgical intervention. While admitting that alcohol had been used in the laboratory to cause ulcer, he inquired whether as a matter of experience it produced hyperchlorhydria in man.

Dr. H. H. SANGUINETTI asked what the comparative mortality was likely to be in the two methods. Until he was sure that there were enough surgeons to perform gastrectomy in all the cases that required it, he should prefer his patients to undergo gastro-jejunostomy, and he welcomed medical treatment for a large number of gastric ulcer cases.

Dr. MARIE CASSIDY said that she had long given up bismuth in favour of magnesia.

Dr. SYBIL EASTWOOD'S experience had shown her, she said, that ulcer in the lesser curvature of the stomach was generally very easy to cure by medical means. Duodenal and pyloric ulcers, on the other hand, though they could also be cured in this way, had a much greater tendency to relapse, and the patients were generally young people in robust health, who did a full day's work and found it more difficult to keep to a diet after treatment. From the psychological point of view, she suggested, it might be better to treat them by gastro-enterostomy when one course of medical treatment had been followed by a recurrence.

The CHAIRMAN, commenting on Dr. Hurst's statement that it was impossible to diagnose gastric ulcer without X rays, remarked that it was sometimes impossible to diagnose them with X rays. Moreover, it was possible with X rays to diagnose ulcers which were not there. The method could not be trusted to detect organic disease. Prepyloric ulcers—which he called duodenal—were sometimes malignant; it was difficult at operation to say whether they were malignant or not, but they were generally irremovable in any case. He advised the recovered patient to take no chances with his diet. Gastro-jejunostomy would, he said, cure even a large ulcer on the stomach. His figures for cure were also 90 per cent., but only a small proportion of the failures had been due to surgery. Four per cent. had died of intercurrent disease, and the jejunal ulcers were entirely the fault of the patients themselves.

Reply.

Dr. HURST said that the British Medical Association's statistics were full of fallacies. The answers had been obtained from 85 experienced surgeons for periods of four to nine years. If the results had been taken for the first nine years of each surgeon's career instead of the last, the mortality-rate would have amounted to at least 10 per cent. instead of 5, and this figure might be taken to represent the real mortality. The risk was too big to run willingly. The medical mortality-rate, on the other hand, was negligible. The gastro-jejunal colic fistula which sometimes resulted from operation for jejunal ulcer was a dreadful disaster, and many patients had to undergo repeated operations. Again, only 60 per cent. of the patients had replied to the questionaire; the remaining 40 presumably included the dead and a larger proportion of the unfit than the 60 per cent. Gastro-jejunostomy gave good results in cases of simple ulcer, but these were just the cases which did best on medical treatment, and those which would not respond to medical treatment would not respond to surgical. The original homes of this operation—Leeds and the Mayo Clinic—had, moreover, abandoned it. Bismuth and soda would mask the symptoms in a large number of cases, and had been the chief means of delaying the recognition of duodenal ulcer in London until about 1904. Alcohol between meals, as in cocktails, was absolutely disastrous, but weak whiskey and soda or light wine with a meal, if the patient had been well for some time, presented little danger.

Mr. SOUTTAR also replied.

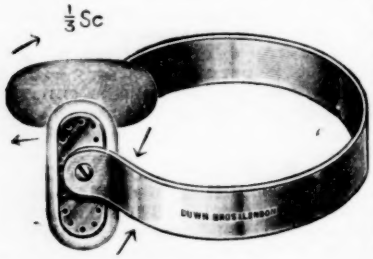
ROYAL SOCIETY OF TROPICAL MEDICINE AND HYGIENE: ÆTIOLOGY OF YELLOW FEVER.—In our report of the discussion following Prof. Kuczynski's lecture (THE LANCET, Jan. 25th, p. 187), Prof. Ledingham's statement "Diphtheroids . . . incubation" should read: "Diphtheroids, though rare as pathogens, were widely distributed organisms, and the occurrence of apparently saprophytic forms in healthy tissues had given considerable trouble in the interpretation of growths from virus-containing organs especially after long incubation"; and the sentence "To take one example . . . visible" should read: "To take one example, the organism of pleuro-pneumonia of cattle could be cultivated in purely artificial media with formation of colonies. Yet the virus-bodies which composed these colonies still remained, though microscopically visible, incapable of very accurate resolution."

Dr. Arkwright said: . . . He understood that, in the case of typhus, cultures which began as cocci were believed to change into something which, if it was not exactly . . . At the same time proteus and rickettsia appeared both to have a fundamental relationship to typhus fever. If the change from one to the other really took place somewhere, it was perhaps begging the question to criticise the change which was alleged to occur in vitro. It was necessary, however, for the observer to take care that his faith in the unity of the two types of organism did not carry him away into accepting . . .

New Inventions.

A NEW VARICOSE VEIN CLIP.

THE spring clip shown in the accompanying illustration has been designed to take the place of an assistant in the operation of varicose vein injection. It consists of two padded metal plates connected by a horse-shoe spring which when applied over the site of an injection exerts sufficient pressure to prevent circulation through the vein while subsequent punctures are being made in other parts of the limb.



The instrument has been made for me by Messrs. Down Bros., Ltd., 21 and 23, St. Thomas's-street, London, S.E.

R. DAVIES-COLLEY, M.Chir. Camb., F.R.C.S. Eng.

NEW TONSIL-HOLDING FORCEPS.

THE advantages of the instrument, here illustrated, over others I have personally used are as follows: 1. The sliding, detachable, fastener prevents the teeth from biting through the tissue of the tonsil as by means of it one can judge the exact amount of pressure necessary to obtain a sufficient hold. 2. It never

slips or tears away, it holds but does not bite through. 3. Made of stainless steel, it is solidly built, has strength to stand hard work and can be taken apart for cleaning. I have found it highly satisfactory in every way and can thoroughly recommend it.

The instrument is made by Messrs. Down Bros., St. Thomas's-street, London, S.E.

GEORGE VARIAN, M.D., B.Ch.

Reviews and Notices of Books.

MINOR SURGERY.

By FREDERICK CHRISTOPHER, M.D., F.A.C.S., Associate in Surgery at Northwestern University Medical School; Attending Surgeon, Evanston Hospital, Illinois. London: W. B. Saunders Company. 1929. With 465 illustrations. Pp. 694. 36s.

SEVERAL volumes on Minor Surgery have recently been published in England and it is therefore interesting to compare them with the latest views on the subject from America. This is a very good book. Its arrangement follows the usual lines except for the welcome addition of a long chapter designed for "The Surgical Intern." This is full of sound advice which may be read with profit, not only by the house surgeon, but also by his chief, and is mostly applicable to residents in our own hospitals. We do not, however, recommend the house surgeon in a London hospital to act on the suggestion that "it is generally desirable to address as many nurses as possible by their names."

The first chapters deal respectively with closed wounds, open wounds, foreign bodies, furuncles and carbuncles, burns, injuries by electricity, circulatory disturbances, and gangrene, while the rest of the book deals with injuries, infections, tumours, and deformities of the different regions of the body. Overlapping has been avoided with skill; "tennis leg" alone seems to be considered—and very well considered—under strains and also under injuries of the lower extremity. It is noteworthy that Dr. Christopher, when discussing antiseptics, everywhere ranks mercurochrome and iodine together, and even states that iodine has been given up as a first-aid dressing on a big railway system on the ground that it gets stale and if applied repeatedly may cause severe burns. He also reiterates most emphatically the doctrine that carbolic should never be used. If he is correct in this, most English general practitioners are steeped in heresy. The American idea of a fomentation seems to differ greatly from our own; here it is described as a large quantity of gauze soaked in warm, not hot, boric solution, and kept warm by an electric pad. In our experience electric pads are apt to produce burns.

Particularly good sections are those on the suture of wounds of face, in which Dr. Christopher is a strong advocate of closure by narrow bridges of adhesive plaster where possible; on the removal of foreign bodies, which removal he rightly emphasises should not be undertaken lightly; on breast tumours and their treatment; on the treatment of tattoo marks; and on local anæsthesia. The chapter on infections of the hand follows the lines laid down by Kanavel, who also contributes a foreword. The treatment of ganglions here advocated is rupture rather than incision. We cannot believe that the ideal treatment of a bromide rash is by intravenous injection of saline. The book is admirably printed on excellent paper and the illustrations are superb. There are few misprints and the English is excellent. The consulting surgeon and the practitioner will find much to interest them, while the house surgeon will find it invaluable.

INFLUENZA.

Etiologie et prophylaxie de la grippe. By R. DUJARRIC DE LA RIVIÈRE. Paris: Masson et Cie. 1929. Pp. 105 and plates. Fr.32.

THE writer of this monograph believes that, of the number of infective agents which have been considered as causes of influenza, only three merit serious consideration—viz., Pfeiffer's bacillus, the influenza filterable virus, and *B. pneumosintes*. Concerning the pneumococcus and streptococcus he has little to say; they are, in the words of Nicolle, "microbes de sortie"; they are found during the illness and

are present in complications, but they are not the cause of the clinical disease. Most attention is given to Pfeiffer's bacillus. The chapter dealing with this organism constitutes, in fact, rather more than half the book, and is an excellent account of the life-history of the organism. The author leaves us with the impression that he considers it the most important of the three claimants to causation which he cites. The other two are, of course, more recent pretenders and there is less to be said, at the moment, for or against them. On the question of prophylaxis the author has progressive views. In addition to provision of hospital accommodation, isolation and immunological remedies such as vaccines during an attack, he advocates mobile laboratories for use during epidemics and more stringent regulations at the frontiers concerning quarantine to prevent the march of pandemics across the world.

The book is chiefly of value for its excellent account of Pfeiffer's bacillus. It is lucidly written and has a short bibliography. There are also numerous good photographs.

PHYSIOTHERAPY IN GENERAL PRACTICE.

Second edition. By E. BELLIS CLAYTON, M.B., B.Ch. Cantab., Director of the Physiotherapeutic Department, King's College Hospital, London. London: Baillière, Tindall and Cox. Pp. 231. 12*s.* 6*d.*

IN this edition over 50 pages have been added and some of the sections have been rewritten, notably those on scoliosis and fibrositis. The added matter is mainly concerned with a survey of treatment by ultra-violet light and various electrical currents. Dr. Clayton has not made any attempt to deal with the new material in detail, and those who wish to carry out his teaching in practice will have to refer elsewhere for detailed information about technique. There are now few points which do not find a place in this book, and the practitioner will find it a reliable guide when he wishes to superintend the conduct of a case under a masseur. The general impression given by Dr. Clayton's views is that they err on the side of caution. Little space is given to what is now commonly known as "manipulative" treatment, an omission that will need rectification in future editions as it is daily assuming a more prominent place in medical practice. The book is well produced.

RADIOLOGY OF THE NORMAL INFANT CHEST.

Das Thoraxröntgenbild des normalen Säuglings. By Dr. ERICH SAUPE and Dr. KURT EHLE. Lehmanns' Medizinische Atlanten, Band 17. Munich: J. F. Lehmanns. 1929. Pp. 41. M.6.

THIS volume of Lehmanns' well-known Atlas is a development of Dr. Saupe's "Thoraxröntgenbild im frühesten Kindesalter" (vol. 16 of this series, which appeared in 1925) and deals with the radiological appearances of the normal infant chest. It is based on 100 cases, after careful exclusion of pathological ones by painstaking clinical and laboratory investigation. The technical difficulties in this branch of radiography have been ably tackled by the authors, who have shown, in 16 good autotype reproductions from their radiograms, the fallacy of the generally accepted statement that the details of an infant's lung cannot be satisfactorily demonstrated by X rays. Their technique makes use of soft radiation and short exposures (effective kilovolts 35, milliampères 70; focal distance 70 cm.; exposure one-tenth sec. with screens), the recumbent child being maintained in a correct position with the head median. The considerable variations in the cardiac and mediastinal shadows and their causes, including slight enlargements of the thymus, are fully discussed with the aid of line diagrams. The lung detail at this age tends to be coarse and patchy, and, since it is almost entirely vascular in origin, shows considerable variation even in the same child at different examinations, according to the degree of filling of the vessels, which in turn depends on the phase and depth of respiration. In crying children this coarse patchy appearance is increased. The impossibility of inferring the presence of a bronchitis is emphasised. The translucency of the lung fields also shows marked variation, and we learn that an inclination of the head to one side suffices in infants to diminish the translucency of one apex through slight compression of the thin-walled bronchus. The monograph, though small, is of considerable practical value and, since it deals with a difficult and somewhat neglected subject with a refreshing absence of dogmatism, it will be welcomed by the radiologist. The references to literature are exclusively to continental publications and neglect the excellent work done in America, notably by W. W. Wasson and other workers in this field.

PHOTOGRAPHIC TECHNIQUE IN RADIOLOGY.

Die photographischen Grundlagen des Roentgenbildes. By Dr. RICHARD HERZ. Leipzig: Georg Thieme. 1929. Pp. 225. M.19.

THE author has confined himself to a straightforward description of the photographic side of the technique of radiography, but he has done his work exceedingly thoroughly and satisfactorily, with the result that the book is not only of use to beginners but also to advanced workers. Particularly interesting and useful is the chapter on the causes of faults and artifacts in films. It is a work which should be in the possession of every radiologist and, though technique may change, it will be many years before it is likely to be out of date.

SEWAGE DISPOSAL.

Principles and Practice of the Dilution Method of Sewage Disposal. By W. E. ADENEY, F.R.C.Sc.I., D.Sc., F.R.San.Inst., Curator and Examiner in Chemistry in the late Royal University of Ireland; Fellow and a former Vice-President of the Institute of Chemistry. London: Cambridge University Press. Pp. 161. 12*s.* 6*d.*

Sewage Disposal from Isolated Buildings. By G. M. FLOOD, B.Sc.Eng., A.M.Inst.M. & C.E., A.M.I.Struct.E., M.R.San.I., F.I.S.E. Manchester: Sutherland Publishing Co., Ltd. 1929. Pp. 257. 12*s.*

THE self-purification of polluted rivers and streams is becoming of increasing importance, especially in view of the establishment of new industries, such as the extraction of sugar from sugar beet and the manufacture of artificial silks. Such industries are being established on the banks of rivers which were formerly pure streams, with disastrous results to the fish and aquatic life. Dr. Adeney's work on questions relating to the oxygenation of water in rivers and estuaries has been of great value, and this volume not only gives a clear account of that work but includes a summary of the literature. The fermentative changes which occur when sewage is discharged to fresh water streams are described in a lucid manner. The researches in progress on the mechanism of the biochemical changes which occur during the fermentation of sewage matters in water are outlined, and the part played by saprophytic and nitrifying organisms in the purification of sewage and similar pollution made clear. Valuable sections are devoted to the rates of consumption of dissolved oxygen by sewage matters in fresh and sea waters. We have here a useful addition to the literature of the subject.

The question of sewage disposal is one of great importance from the sanitary point of view and often involves difficult problems with regard to the protection of water-supplies and the avoidance of nuisance. Mr. Flood has attempted to cover rather too much ground, and has introduced material of a highly technical character which is not germane to his object of giving "definite constructive information." The descriptions and constructional details of various types of plant are good and will prove useful to sanitary

authorities. The illustrations are numerous and well selected and indicate clearly the arrangements necessary in the various conditions that may arise. The sections of the book which include elaborate accounts of various organisms found in sewage and alleged to take part in sewage purification might have been omitted without loss of value. Such information can be obtained readily and more accurately in special works on the subject. The descriptions and nomenclature of organisms are not always strictly accurate. Chapter XI., devoted to the design of filters, contains much useful information, but the capacities recommended are much underestimated and engineers constructing plants would be well advised to make more liberal provision.

COLLECTION OF PUBLISHED PAPERS.

Published Papers by Members of the Staff of the Middlesex Hospital Medical School: 1928–29.

THIS collection of over forty papers published during the last academic year contains valuable contributions to medical science, many of which have previously appeared in these pages. From the Bland-Sutton Institute of Pathology come contributions on the subject of malignant disease, such as Prof. J. McIntosh's paper on the Rous Tumour and Its Bearing on the Virus Theory of Cancer, and that on Giant-cell Tumours of Bone in a Fowl, by Dr. S. L. Baker. The biochemical department contributes many valuable papers, such as that on the Œstrus-producing Hormone, by Prof. E. C. Dodds and three of his colleagues, while the department has also collaborated in a big piece of team-work research with Mr. G. Gordon-Taylor, Mr. R. V. Hudson, and Dr. L. E. H. Whitby on the Remote Results of Gastrectomy. From the Cancer Research Laboratories and Department of Physics there are several papers on the effects of radiation, of which that by Prof. S. Russ and Miss G. M. Scott on the Differential Action of X Rays and Gamma Rays upon Some Living Tissues is an example. The Physiological Department is represented by some interesting studies, notably that by Prof. Swale Vincent and Mr. J. H. Thompson on the Rôle of the Thyroid and Parathyroid Glands in Vaso-motor Reflexes. Lastly, there are many important contributions on clinical medicine and surgery, of which Dr. Shirley Smith's paper on the Pain and Discomfort of Congestive Heart Disease, and Mr. Sampson Handley's several papers on breast carcinoma may be mentioned. These few examples serve to show that the staff of the Middlesex Hospital continue to regard research as one of their most important duties. We must repeat the plea made in previous years—that such a collection deserves a more permanent and fitting production than the conglomeration of reprints of various shapes and sizes assembled in this volume.

JOURNALS.

JOURNAL OF PATHOLOGY AND BACTERIOLOGY. Vol. XXXIII. Pp. 1–232. January, 1930.—The production of staphylococcal toxin, by F. M. Burnet (Melbourne). *S. aureus* does not produce hæmolysin in broth cultures unless the cultures are incubated in an atmosphere containing excess of CO_2. The white variants produce hæmolysin freely.—The pathogenesis of and propagation of the virus in experimental poliomyelitis, by R. W. Fairbrother and E. W. Hurst (London). The disease begins as a primary degeneration of nerve-cells with an inflammatory reaction of the connective tissue, not as a meningitis. After intracerebral inoculation the virus spreads along the axis-cylinders downwards, and owing to the greater susceptibility of the lumbar nerve-cells symptoms usually appear first in the legs; the symptoms are therefore no guide to the spread of the virus or to the point of entry. Virus is present in greatest amount in the neighbourhood of the lesions in the cord; it survives for only a few days in the cerebral cortex and hardly ever reaches the cerebro-spinal fluid.—The action of certain dyes on the bactericidal activity of normal serum and on hæmolytic complement, by J. Gordon (Leeds). Congo red and other dyes prevent the hæmolytic and bactericidal actions of serum; the mechanism is not yet explained.—Dysentery toxin (Shiga), by C. C. Okell and A. V. Blake (London). Active preparations of Shiga toxin may be obtained by filtering broth cultures after about a fortnight's growth, and from this filtrate the toxin may be precipitated by ammonium sulphate. In the early stages of growth the toxin is held within the bodies of the healthy bacilli; afterwards autolysis gradually disintegrates the bacilli and sets free the toxin into the medium.—Generalised osteitis fibrosa with parathyroid hyperplasia, by A. M. Drennan (Dunedin). A typical example in a woman of 63 with a large parathyroid adenoma.—Miliary aneurysms in the brain, by F. H. K. Green (London). Small aneurysms are found only in a small proportion of deaths from cerebral hæmorrhage, and only where the media of an artery is grossly involved in atheromatous degeneration. The anatomy of two examples is minutely described.—The pathology of disseminated encephalomyelitis of the dog (the "nervous form of canine distemper"), by J. R. Perdrau and L. P. Pugh (London). The disease has nothing to do with distemper; its relation to the "hysteria" of dogs is doubtful. There is a characteristic infiltration of the meninges and perivascular spaces of the brain with small round cells, and in four instances demyelination of the type seen in acute disseminated sclerosis was found.—Oat-celled tumours of mediastinal glands, by J. B. Duguid and A. M. Kennedy (Cardiff). Barnard showed that most oat-celled tumours of the chest are carcinomata of bronchi; this is not invariably the case, for a few arise from the mediastinal glands.—The changes in the mammary gland preceding carcinoma, by A. A. Charteris (Glasgow). Most cases arise from epithelial proliferation in the ducts.—Further experiments on the carcinogenicity of synthetic tars and their fractions, by C. C. Twort and J. D. Fulton (Manchester). The activity of a number of artificial tars varies with the substance used as a source and with the temperature of distillation; it may be greatly reduced by oxidation or reduction, and may be concentrated by fractional distillation.—Note on the fermentation of starch by certain hæmolytic streptococci, by F. W. Andrewes (London). Some strains ferment, others do not; the power is not related to pathogenicity.—Spontaneous tuberculosis in the guinea-pig, by A. Stanley Griffith (Cambridge). Seven examples of this rare condition, which may be caused by human bovine or avian bacilli.—The specificity of active immunity against snake venoms, by C. H. Kellaway (Melbourne). The specificity of the active immunity induced in guinea-pigs by fresh or formalised venom depends on the zoological relation of the snakes involved and the constitution of the venom, the former being more important. The specificity is not so clearly marked as with the corresponding antitoxic sera and immunisation with, for instance, copperhead venom confers a considerable resistance to tiger snake venom.—The late results of intravenous injection of colloidal iron, by D. F. Cappell (Glasgow). The iron is first taken up by the reticulo-endothelial system generally and afterwards redistributed, accumulating in the liver, spleen, and lymphatic glands. Nothing like hæmochromatosis is produced.—Cholelithiasis in the insane, by G. W. T. H. Fleming (Dorchester). At the younger ages (20 to 40) gall-stones are more frequent in the insane than in an average hospital population.—The thermal death-rate of the bacteriophage, by S. H. Nanavutty (London). The fatality of heat to bacteriophage varies with the suspending medium. The mode of death suggests that the individual units vary in their heat resistance.—Titles of the other papers are: An unusually large adenoma of the liver, by R. G. Dhayagude (Bombay).—On testing *C. diphtheriæ* for virulence by the intracutaneous method, by W. Mair.—A colour-index ratiometer, by F. T. Grey.—The prognostic value of protein determinations of the cerebro-spinal fluid, by F. T. Grey.

THE LANCET.

LONDON: SATURDAY, FEBRUARY 1, 1930.

THE BACTERIOLOGY OF INFLUENZA.

THE publicity given to recent work at Chicago on the bacteriology of influenza has again turned attention to this problem. It has been maintained by some epidemiologists that the disease clinically known as influenza is but part of a much more comprehensive wave of morbidity which constitutes the true influenza. It seems a pity that the same name should be used for such distinct ideas. Whether this conception is correct or not it is obviously of advantage to discover the exact microbic infection in the cases of disease, and a great deal of work has, of course, been directed towards this end. The similarity of the curves of rise, fall, and recurrence of influenza in 1889–90 and 1918–19 epidemics, and (as far as records go) in previous epidemics, suggests that some uniform factor was at work. The forms of the waves and the type of disease were apparently independent of climate, season, and country, though the rate of mortality was probably influenced by the weather to some extent. There is evidence that scattered cases of influenza-like disease of moderate severity have preceded the two great pandemics of the last 40 years. The first wave of the epidemic is characterised by cases of severe acute fever, often with only slight signs of localisation in the upper air passages. After the rapid rise and fall of this wave and an interval of one or two months, the second wave appears with a much more definitely bronchitic and pneumonic form of disease. Later, a further wave or waves occur with catarrhal or pulmonary cases, of irregular but usually lessened severity. How far epidemics confined to a single town, country, or continent should be considered to belong to the same type as pandemic influenza is undecided.

It is generally acknowledged that influenza is a disease spread by infection, but the symptoms of patients, especially at different periods of the epidemic, are very diverse. The clinical diagnosis of individual cases is notoriously unreliable and comparative certainty is only reached in the presence of an epidemic. The change in character of the symptoms and lesions from one period or wave to another needs some special hypothesis to explain it, in whatever category of causes it is sought. Whether the primary causes of the epidemic are conceived as external to the human body and its invading microbes, or as concerned with the infecting micro-organisms themselves, this changeability undoubtedly is an essential feature. Inquiry has been chiefly directed to finding out whether changes in the bacterial agents alone may not be a sufficient reason for the variation in the disease and the course of the epidemic. Three main kinds of micro-organisms are known to infect and invade the tissues in many cases of influenza and have been inculpated in turn by bacteriologists. These are the *Bacillus influenzæ* of Pfeiffer, various streptococci, including the pneumococcus, and *B. pneumosintes*. The last, though probably related in some way to certain outbreaks of so-called influenza, has only occasionally been recognised, and its claim to importance rests on its association with a limited number of cases of the disease. The pneumococcus undoubtedly may be a serious infectant but has never been held to be the sole primary infective agent. Various strains of the streptococcus are very frequently found in infections of the air passages in influenza, but particular influenzal types have not been widely recognised, though in some outbreaks—especially in the more severe phases—streptococci have been held responsible for broncho-pneumonic lesions. The claim by FALK and his colleagues[1] to have identified the streptococcus which caused the epidemic in Chicago in 1928–29 does not, so far, carry conviction but cannot be fully discussed till a more complete account of their work is accessible.

All the above-mentioned bacteria have often been found acting in company as pathogenic agents. Their relative prevalence and claims to importance are well and critically reviewed by Dr. W. M. SCOTT in Vol. II. of the "System of Bacteriology," which is being issued by the Medical Research Council. *B. influenzæ* is the only bacterium which has sufficiently often been found in intimate association with the disease processes to justify the claim that it is the essential pathogenic organism of influenza. Its rôle is much disputed, however, and the first point to decide in discussing the ætiology of influenza is whether a virus infection predisposing to a bacterial secondary invasion must be invoked to account for the rapid spread and high infectivity of the disease and its other features. There is little doubt that *B. influenzæ* and streptococci gain in pathogenicity during an epidemic and it is perhaps gratuitous to import an unproven virus to account for the increase of susceptibility to these infections. It would be necessary to assume that as the hypothetical virus spread over the world the secondary agents accompanied it, unless it were thought that these latter were ubiquitous and in each case assumed increased virulence under the influence of the virus. Such an explanation would not be complete, since the virulent secondary infections are almost certainly sometimes passed from patient to patient. It seems simpler to suppose that occasionally a bacterial agent assumes increasing virulence and by passage through many susceptible subjects further adds to its invasive and pathogenic powers and becomes associated with fresh colleagues in its course. The rapid transference is aided by the increased bronchial secretions and their expulsion and dissemination by coughing. Such an increase in pathogenicity of the infective agent is a necessary hypothesis in any attempted explanation of influenza and is known to occur to some extent in experiments with *B. influenzæ* and streptococci. It is no greater assumption to suppose increased virulence of these bacteria than of an unknown virus which would also be required to bring about increase of virulence in several kinds of bacteria. In estimating the relative probability of such occurrences one must take into consideration that the *B. influenzæ* is known to be remarkably variable in its cultural characters and toxicity. Though described by PFEIFFER in 1892, the methods required for its identification and its cultural needs have only been completely understood in the last eight or nine years as the result chiefly of the work of FILDES [2] and TJÖTTA and AVERY (1921),[3] on the X and V accessory growth factors and the new method of selective culture by the use of aspergillin demonstrated

[1] See THE LANCET, Jan. 25th, p. 197.

[2] Fildes, P.: Brit. Jour. Exper. Path., 1921, ii., 16; 1923, iv., 265.

[3] Tjötta, T., and Avery, O. T.: Jour. Exper. Med., 1921, xxxiv., 97 and 455.

by FLEMING [4] last year. The culture and isolation of *B. influenzæ* was not so readily obtained in 1918 as at the present day and this may explain its apparent absence in some outbreaks.

PROFESSIONAL PRIVILEGE: THE QUESTION OF DIVIDED LOYALTIES.

A South African journalist has gone to prison sooner than disclose information which came to him under a promise of secrecy. He had to choose between two loyalties—a dilemma, not entirely academic, which the medical profession has sometimes to encounter. The journalist had written an article on the subject of an alleged illegal lottery; he was thereupon questioned by a magistrate under the Police Administration Act, presumably with a view to criminal proceedings in which his evidence might have been material. He refused to answer the magistrate's questions. No doubt it was pointed out to him that journalists enjoy no form of professional privilege under the law, and that every citizen owes the State the duty of assistance in the detection of crime. He preferred, however, to remain faithful to his promise, and he left it to the police to carry out unaided their function of discovering a criminal offence. It happens that not long ago a similar incident occurred in America. A Washington newspaper had been dealing with alleged breaches of the prohibition laws. Three of its reporters were summoned before a grand jury and were asked as to their source of information. They, too, declined and were sentenced to imprisonment. Perhaps it is unnecessary to point out that the jurisdiction in both the South African and the Washington incidents is not one which operates in England. Apart from a remarkable clause in the Official Secrets Act of 1920 (an unobtrusive survival of the wide powers entrusted to the executive during the war), there is no power in England for the police or grand jury to interrogate witnesses at large under threat of imprisonment for refusal to answer. It may, however, happen at any time that a medical practitioner may be pressed in the witness-box to disclose his patient's confidences entrusted to him under a pledge of secrecy not less binding because not formally expressed or legally sanctioned.

The Washington journalists, it seems, have served their imprisonment: they have maintained the principle for which they stood and their case is ended. It is not clear whether the South African journalist is imprisoned indefinitely or not. It seems a case in which the prospect of appeal is dubious, but it is said that an appeal is being undertaken Publicity will bring public opinion to bear on one side or the other, and in the long run the law must conform to public opinion. If, in an extreme case in England, a doctor refused to answer questions in the witness-box on the ground of professional privilege, would public opinion support him? The court, jealous of its authority, would not lightly pass over what it would regard as an act of disrespect. Wilful disobedience to a subpœna not only means attachment for contempt of court, it also involves possible liability to the party at whose instance the witness is summoned for any damages which that party can show that he has suffered by the loss of the evidence. This latter liability, naturally, would not arise if the patient called the doctor as a witness, because the privilege is in the interest of the patient, and the patient can absolve the doctor from the duty of secrecy. The general question of medical privilege has never been pressed upon popular notice; for this purpose some such sacrifice may be required as has lately been made in the two cases under discussion. The legal profession is allowed by law a complete privilege; the explanation is that people cannot get justice unless they can be sure of frank consultation with their legal advisers. The medical profession is allowed by law no privilege at all, though frank consultation between patient and medical adviser is obviously an essential condition for the treatment of ill-health. The public ought to consider whether the tradition of medical secrecy deserves support. It should do so without the excitement of seeing medical martyrs volunteering for prison for the sake of principle.

[4] Fleming, A.: Brit. Jour. Exper. Path., 1929, x., 226.

THE CASE AGAINST THE WIDAL TEST.

IT appears from various reports that a modification of the agglutination test of Widal is likely to have a wider and more useful application in the diagnosis of typhoid fever than did the original test, and that the Widal though practised with a perfected technique is still open to much criticism. It fails in three respects—namely, in the early serological diagnosis of typhoid fever; in the previously inoculated individual; and in the persistently negative case; and it has never held out any hope of detecting the carrier. That a negative Widal reaction is frequently a most misleading report, is an opinion widely held among clinicians. That it may become positive in the third or fourth week of disease is of comparatively little value to them. Laboratory workers, however, must have criticism based on unquestionable diagnosis before deciding to abandon the test. A series of cases reported by FELIX[1] in which cultures were made, and a larger series by PIJPER[2] in which cultures and complement fixation were done, amply confirm this general impression. In PIJPER'S series, assuming a dilution of 1 : 40 as diagnostic, then out of 199 samples of serum (representing 120 cases) only 160, or 80 per cent., were positive, while if 1 : 80 be taken as the crucial dilution, only 102, or 51 per cent., were positive. Or analysing his figures from the more practical clinical point of view, only 72 cases, or 60 per cent., were positive in a dilution of 1 : 40 at the time of the first serological examination, which is the time when the clinician really needs help. There is clearly room here for improvement greater than that afforded by the perfection of quantitative standardisation such as is achieved by Dreyer's technique. Next in practical importance at the present time is failure of the Widal test to afford help in the inoculated person. FELIX has stated,[3] and is supported in this belief by numerous authorities that "it is now established beyond all question that after the agglutinins which are produced by vaccination have already disappeared from the blood, they can reappear after many years, under the non-specific stimulation of some non-typhoid disease as an anamnestic reaction." Thus the interpretation of a positive Widal in a previously inoculated person is always open to doubt. The third failure is in the persistently negative case, whose serum at no time during disease or convalescence gives a positive agglutination test. Attention has been drawn to these cases by FELIX, PIJPER, and BURNET, and in our last issue by GARDNER, HOBSON, and STENHOUSE.[4]

[1] Felix, A.: Journal of Immunology, 1924, ix., 115.
[2] Pijper, A.: S. A. Medical Record, 1923, xxi., 51 and 74.
[3] Felix, A.; Loc. cit., p. 137.
[4] Gardner, A. D., Hobson, F. G., and Stenhouse, G.: THE LANCET, Jan. 25th, 1930, p. 182.

Independent attempts to solve these difficulties were made by FELIX and by PIJPER; the former succeeded by means of his "qualitative receptor analysis," the latter by an application of complement fixation. Both these substitutes achieve the same ends. They enable an earlier diagnosis to be made; they bring to light the nature of the disease in the persistently negative case, and they circumvent the difficulty presented by previously inoculated individuals. Further, PIJPER has shown that carriers react positively to complement fixation, and by Felix's method the whole enteric group can be differentiated in one dilution without titration of the serums. The principles of complement fixation are sufficiently well known to need no introduction. Qualitative receptor analysis, dependent on the detection of "O" (or group small-flaking agglutinins) and "H" (or specific large-flaking agglutinins) is still somewhat of a mystery. In its simplest terms it means that instead of the typhoid bacillus possessing one kind of agglutinogen only, giving rise to one kind of agglutinin, it may be, and usually is, composed of two antigens the "O" or group and the "H" or specific. These are named in German *Hauch* and *Ohne Hauch* from the spreading and non-spreading growth of *B. proteus*, in which organism these antigens were originally discovered by WEIL and FELIX. "O" antigen gives rise to "O" agglutinins only; "H" antigen gives rise to both "O" and "H." Now in the majority of cases of typhoid, the "O" agglutinin appears in the serum at an earlier date in the disease than the "H" form, and it is the latter type of agglutination which an ordinary Widal test detects. It does so because nearly all test suspensions consist of "H" forms of typhoid bacilli. Thus the useful early appearing "O" agglutinin is entirely missed. In inoculated persons the anamnestic reaction is accompanied by "H" not by "O" agglutinins, therefore the appearance in a subsequent fever of "O" agglutination indicates that the disease really is an enteric fever. It must be pointed out, however, that "O" agglutination is a group reaction—i.e., it is common to typhoid, the paratyphoids, and Gaertner infections, and further differentiation within the group may have to wait till "H" agglutinins appear; but that the disease is due to a bacillus of the group will be certain, for the small flakes are not provoked by other fevers. It will be seen that in the inoculated person differentiation within the group may be impossible. The further discovery by FELIX of the culture known as *B. typhosus* 901, which is extremely sensitive to "O" agglutinins, and remains so in subculture, has enabled practical use to be made of this analysis. This work has been repeated and confirmed by BURNET, PIJPER and STUART and KRIKORIAN. The exact relation which these antigens bear to rough and smooth (somatic and flagellar) and to the chemically isolated antigens has not yet been established.

An example to which we have already referred of the persistent negative Widal reaction in the case of typhoid fever reported by GARDNER, HOBSON, and STENHOUSE, illustrates the usefulness of the new method. A patient with a clinical picture of severe typhoid fever had Widal tests done on the nineteenth and twenty-fifth days of the disease. On both occasions they were negative but on the second occasion the serum was tested for "O" agglutination, and a blood culture was made. The "O" agglutination proved positive (1 : 500 with living saline suspensions of *B. typhosus* 901) and a non-motile typhoid bacillus was isolated from the blood. Had the "O" agglutination test not been done in this case, the diagnosis would still have remained in doubt till the bacillus became motile. The authors, as a result of their experience, recommend "O" suspensions to all pathologists and clinicians. *B. typhosus* 901 is in the National Collection of Type Cultures; and Dr. GARDNER has prepared standard suspensions from it at Oxford.

Annotations.

"Ne quid nimis."

HEALTH OF THE ARMY IN 1928.

THE annual report on the health of the Army, which has just been issued,[1] is signed by Lieut.-General H. B. Fawcus; it appears a month earlier than last year, is of the same size but costs sixpence more. It tells of improving conditions; influenza was almost absent, malaria was decreasing, in India the malarial sickness-rate fell from 138·8 to 91·3 per 1000, and the sick daily from 3·40 to 2·40. In the Army at home and abroad there were 183,333 men, of whom per thousand 426·2 (last year 467·7) were admitted to hospital, 1058·9 (1106·7) were treated as out-patients, and 38·98 (42·79) were daily under treatment. There were 9464 officers, of whom 29 (10) died from injury. There were fewer cases of disease this year among cadets, and diphtheria was the only serious preoccupation in the schools for boys; Schick testing and immunisation approved themselves after experience, and all new entrants to the schools are to be thus dealt with in future. Among the men, the chief causes of admission to hospital were venereal disease, 39·3 (49·1), malaria, 35·7 (49·5), and tonsillitis, 33·3 (33·8). The death-rate was 2·36 (2·42), the chief causes being: injuries 133, pneumonia 59 (73), "other digestive diseases" 44 (43), tubercle 30 (32), "other infective diseases" 25 (20), suicide 25 (38), tumours 24 (9), enteric group 20 (15). The invaliding rate was 9·06 (11·43), chiefly due to disease of the middle ear and to tubercle, 207 (213) cases, 1·13 (1·08); 34 were invalided for hysteria. The disease causing most loss of service is gonorrhœa; the average case seems to last 58·5 (53·1) days. Scabies cases were cured in a day less than last year, 7·16 days. Dysentery is in India mostly bacillary, 80 per cent.; immunisation by bilivaccine was thoroughly tried, but results were conflicting. Enteric cases were 30 at home, 20 of them in one epidemic at Aldershot, cause not stated. About 98 per cent. of the Army—officers, men, women, and children—is protected by inoculation. Single doses of the protective vaccine are thought ineffective; it seems to be the idea that cases are mostly spread by carriers. Malaria, 6550 (9264) cases, 35·7 (49·5) has greatly decreased, the figures for India are 5142 (7723), 91·3 (138·8). For their protection troops are sent to the hills during the malarial season, barracks and houses are mosquito-proofed with copper wire netting, and mosquito-breeding places are controlled. At a new station, Changi, near Singapore, the anopheles group are so reduced that it is thought mosquito-proofing of the new barracks will be unnecessary. Paris green powder, harmless to larger animals, is cheaper than oil for destroying larvæ. As to treatment, plasmochin has been found to prevent relapse better than any other drug used. Treatment of pneumonia with rectal injections of permanganate was strongly approved in Cairo, but not at Woolwich. Tubercle is less, but there is no table of the prevalence at ages, as in the last R.A.F. Report.[2] Sandfly fever was more frequent. As appendicitis cases come to notice quickly, results are good; 1144 cases with but

[1] London: H.M. Stationery Office. 1930. Pp. 144. 5s.
[2] See THE LANCET, 1929, ii., 990.

15 deaths. Of Mediterranean fever one case was definitely diagnosed, but over 900 occurred in Malta in 1928. Of knee cartilages, 202 internal were removed and 6 external; all the patients went to duty. Twenty-four gastric ulcers were operated on but six died; 28 duodenal with one death. Extensive improvements are being made in barracks, married quarters and hospitals, also in feeding the men and cooking for them. The Thames flood of January, 1928, wrecked two museums of the R.A.M.C. College, but they are being restored. Pathological laboratories are being put into all Indian hospitals. Four laboratory-diagnosed enteric cases are noted, one thought to be sandfly fever, one broncho-pneumonia, one nephritis, one jaundice. Of the malaria cases, 72 per cent. were benign, 14 malignant tertian, 1/10 per cent. quartan, only 13 per cent. were not microscopically diagnosed. At Hong-Kong, in 50 obstinate jaundice cases, half were found to have ascaris, which being removed they recovered. A single case of scurvy was diagnosed in London, but no signs or symptoms are mentioned. A new first-aid packet is being prepared. There is much of interest in this report.

BERI-BERI IN A WHALING EXPEDITION.

IT might have been expected that, with our present knowledge of the ætiology of beri-beri, a well-organised whaling expedition would be able to avert this calamity. That this is not so is evident from a paper in *Tidsskrift for den Norske Laegeforening* for Dec. 15th, 1929, in which Dr. Johannes Nissen, medical officer to a Norwegian whaling expedition, discusses a state of affairs which gave him good reasons for the greatest anxiety. It may be added, by way of preface to his paper, that the revival of the Norwegian whaling industry during the last two decades is almost the only bright spot in the financial situation of a country suffering profoundly from post-war commercial depression. Thousands of Norwegians depend on the whale for their living, and any factor interfering with the smooth running of whaling expeditions may be a serious matter to the whole country. Dr. Nissen was attached to a South Shetland whaling expedition in 1927–28. In the middle of March, 1928, beri-beri broke out on a boat, *Pythia*, which was stationed a day's journey from Deception Island, where Dr. Nissen was working. Early in April three of the crew had to be landed and admitted to hospital on the island, one of them dying two days after admission. There were altogether 37 well-defined cases of which five were severe. There were also 14 other cases of early beri-beri in which objective signs of the disease were not demonstrable; the men complained of lassitude, tenderness of the muscles of the legs, palpitation of the heart, and a feeling of ants creeping on the skin. In the well-defined cases the above-named symptoms were followed by the development of œdema about the ankles and front of the tibia, by anæsthesia and absence of the patellar reflex, and in five cases by pareses. The dietary of the expedition was rich (too rich in Dr. Nissen's opinion) with three hot meals a day; peas, salt meat and pork twice a week, pork and beans twice a week, a soup of salt cabbage and carrots once or twice a week, stewed dried apricots or prunes, salted and dried fish once a week, "betta" soup or salt mackerel or herring once a week, tinned meat twice a week, and from the new year onwards fresh pork once a fortnight. Whale meat was occasionally eaten, and potatoes every day. But while five of the seven boats of the expedition were provided with wholemeal bread, in addition to ordinary fine rye bread and wheaten bread, or a mixed loaf containing rye and wheat flour, the bread eaten on the *Pythia* was made from finely sifted rye flour of poor quality. Dr. Nissen is inclined to trace the outbreak of beri-beri chiefly to this but also to several other causes. In addition to the lack of wholemeal bread, he noted that the sleeping quarters of the crew were damp and dirty as compared with those of the other ships. He also found that the potatoes were in an unsatisfactory state, and it would seem that on a ship's voyage from Norway, through the tropics, to the Southern Hemisphere, some of the crew are employed almost all the time in attending to sprouting potatoes which, after they have been stripped two or three times of their sprouts, have presumably lost most of their B-vitamins. This difficulty cannot be got over by provisioning a ship with potatoes in a South American or South African port, for the Norwegian sailor dislikes the insipid and sweet taste of potatoes grown south of the Equator. Dr. Nissen, therefore, suggests that the quarters on board ship reserved for food storage in the ships of whaling expeditions should be subject to much more stringent regulations than at present, and that, as far as potatoes are concerned, a cool place must be provided, the temperature of which can be kept only a couple of degrees above freezing-point. Yet another recommendation is that the rich dietary of the present régime should be simplified. For, as various observers have remarked, it is the fat man rather than the lean man who develops beri-beri. Dr. Nissen adds that medical officers of modern whaling expeditions often find dyspepsia the most frequent of all the ailments on board ship. He concludes: "The dietary of our fleet should be completely changed."

CORONARY THROMBOSIS.

Dr. S. A. Levine's review[1] of the Clinical Features of Coronary Thrombosis is based on a series of 145 cases, reports of which are given in full. Forty-six of these cases eventually came to autopsy and the pathological findings are considered in detail. Most of his patients had suffered from ordinary angina before the onset of coronary thrombosis, but some had apparently enjoyed unusually good health up to the moment of the attack, and had indulged actively in sport or other forms of vigorous physical work. In 34 cases glycosuria was present, and of these a considerable number were actually diabetic. Fifty-eight patients were known to have suffered from high blood pressure and in several others sclerotic changes were found in the retinal arteries. In some instances there appeared to be a definite familial tendency to hypertension or coronary disease. Neither syphilis nor rheumatic infection seemed to be directly related to the condition. The disease was much more common in males than in females, and the average age of the group was 57·8 years.

The pain of coronary thrombosis differs from that of ordinary angina in its duration and in not being relieved by nitrites, since the attack itself is usually associated with a sudden fall in blood pressure. After the attack the heart sounds are weak, and auricular fibrillation, ventricular tachycardia, gallop rhythm, and other disturbances of the cardiac mechanism are apt to be present. A pericardial friction rub may be heard. In addition to these purely cardiac manifestations, shock, vomiting, and dyspnœa serve to distinguish coronary thrombosis from ordinary angina, while the infarction often gives rise to a slight rise of temperature and a leucocytosis in the blood. In fatal cases death may be due to ventricular fibrillation, shock, or rupture of the heart, while patients who survive the early complications are liable to manifest a progressive type of congestive heart failure. Fifty-three per cent. of the patients in Dr. Levine's series died as the immediate result of the attack. He deals very fully with the electrocardiographic signs of coronary thrombosis, and illustrates his paper by numerous records, but he points out that the characteristic changes are not present in all cases. As regards treatment, he advocates avoidance of cardiac stimulants when the systolic pressure does not fall below 100, and prefers to concentrate attention entirely on the relief of pain by adequate doses of morphia. When, however, the patient is in a state of collapse, caffeine,

[1] Medicine, Sept., 1929. Obtainable in England from Messrs. Baillière, Tindall and Cox, London.

adrenalin, or strophanthin may be helpful, and in dealing with the important complication of ventricular tachycardia quinidine is called for. In 39 of the 46 cases (85 per cent.) in which an autopsy was obtained, the vessel involved was the anterior descending branch of the left coronary artery. Less commonly there was a diffuse arterio-sclerosis involving the smaller coronary branches and leading to chronic fibrous myocarditis. Dr. Levine suggests that this group probably provides most of the clinically atypical cases in which infarction is unaccompanied by pain. In two cases only was occlusion in the right coronary artery revealed post mortem, and it is interesting to note that in neither of these did the patient complain of pain.

OPIFERQUE PER ORBEM DICOR.

THE motto accompanying a coat-of-arms has sometimes very little obvious connexion with the blazon or with the status and occupation of the person or persons to whom it was granted. It is rare, indeed, to find a motto so appropriate as that of the Society of Apothecaries of London. It completes the achievement, not only in furnishing a clue to the meaning of the escutcheon, but also in showing in a very definite sense the aims and objects of the ancient guild to which it was granted. In a paper recently read before the Historical Section of the Royal Society of Medicine[1] Dr. T. Vincent Dickinson, a past Master of the Society of Apothecaries, gave some interesting information and

details of the Armorial Bearings. These were devised, he said, by William Camden, Queen Elizabeth's celebrated Charenceaux King of Arms, in 1617 soon after James I. had finally separated the Apothecaries from the Grocers and Pepperers at the instance of Gideon de Lame and granted them a Charter of their own. The details and motto are founded on the episode of Daphne in Ovid's Metamorphoses. Apollo, who has just killed the gigantic python, "Qui modo pestifero tot jugera ventre prementem stravimus innumeris tumidum Pythona sagittis" is depicted with radiant head denoting his sun godhead with a golden bow in his left hand and an arrow in his right, striding over the prostrate foe. It seems to indicate an energetic and combative spirit and points the moral that the occupation of the Apothecaries was not merely mechanical like that of the Barber-Surgeons, nor purely studious and abstract like that of the Physicians, but was an Art founded on action with a firm grasp of the weapons wherewith to combat disease and an ever ready recourse to the means of doing so. Ovid states that the first of Apollo's loves was Daphne, daughter of Peneus, "a love that no blind chance brought to him but Cupid's heartless wrath." Apollo, having just killed the Python, twitted Cupid: "Wanton boy, what hast thou to do with warrior's arms?" And Cupid's answer was: "Thy bow may pierce all else, but mine shall pierce thyself." Thereupon from the quiver which held his arrows he drew forth two shafts of diverse powers; the one banishes love, the other creates it. That which creates love is made of gold and has a bright keen point, but that which banishes love is blunt and has a barb of lead at the tip. Now this latter did the God Cupid fix in the heart of the nymph Daphne, the daughter of Peneus, the River God, but with that other he wounded Apollo to the very marrow, piercing all his bones. Straightway Apollo was love-sick but Daphne fled from the very name of lover and took solace in the gloom of the forest. When Apollo pleaded his suit, faster than the light wind she fled away and paused not at his words as he tried to call her back. "O Nymph! O daughter of Peneus, I pray thee stay! Rash one, dost thou not know from whom thou art flying? Jupiter is my Sire; medicine, too, is my discovery, and I am called all the world over the Bringer of Aid. (*Inventum medicina meum est, opiferque per orbem dicor.*) For the virtue of all herbs are at my bidding, but woe is me: for love may not be cured by any herbs." But Daphne prayed to her father to change her fatal beauty and she became transformed into a laurel. Even in this shape Apollo loved her still. "Now since thou canst not be my wife, thou shalt be my tree. My locks, my lyre, my quiver shall wear thee ever, O laurel tree! and even as my brow is ever young with locks unshorn, so do thou likewise keep evergreen for all time the beauty of thy foliage." The motto is an exortation to all descendants of Apollo, the discoverer of Medicine, bringers of help, that they too may keep evergreen for all time and that each member of the craft may follow his footsteps and example and ever seek more and fuller knowledge of that healing Art which can assuage all ills but that of love, and gird their loins and discharge their shafts against the dragon of disease so that when the victory is ours each may say with truth "Opiferque per orbem dicor."

[1] Proc. Roy. Soc. Med. (Hist. Sect.), 1929, xxiii., 11.

ACTINOMYCOSIS IN MAN AND ANIMALS.

THE investigation of actinomycosis has not kept pace with that of other granulomata, such as tuberculosis and syphilis, during the last 50 years. Dr. Leonard Colebrook, addressing the Combined Section of Comparative Medicine and Surgery at the Royal Society of Medicine on Jan. 22nd, suggested a revision of the confused nomenclature at present in use. His classification is as follows:—

I. Infections associated with granules bearing clubs. Due to: (1) *Actinomyces bovis* (Wolff Israel). (2) Mycelial organisms distinct from *Actinomyces bovis*. (3) Actinobacillus of Lignière and Spitz. (4) Staphylococcus. (5) *Bacillus pyogenes* (possibly a causative organism).

II. Infections by mycelial organisms, showing no granules, or no granules with clubs. (6) Due to unclassified organisms (streptothrix).

Dr. Colebrook suggests the term "actinophytosis" to cover the whole of Group I., but Mr. T. J. Bosworth, before speaking of actinomycosis in animals, deprecated the use of the term in veterinary practice as suggesting a connexion between several quite distinct conditions. He used "actinomycosis" and "actinobacillosis" as separate terms, and included all other lesions of a similar nature under the heading of "botryomycosis," irrespective of club-formation in the granules. Actinomycosis, due to *Actinomyces bovis*, causes lesions of the jaw in animals, and is rare elsewhere. It does not involve the lymph glands, though these often become enlarged owing to chronic adenitis. Actinobacillosis, due to the bacillus of Lignière and Spitz, is more common than actinomycosis in animals, and usually affects the head and neck; more rarely the skin, lungs, liver, and intestine. This condition involves the lymph glands. "Botryomycosis" usually affects the udder only in cattle, and the differential diagnosis is from tuberculosis; in swine it affects the

mammary glands, and in horses the spermatic cord and the head. In man it is no longer held probable that infection occurs from impaction of vegetable foreign bodies. The work of Naeslund (Sweden) suggests an endogenous infection by actinomyces attached to carious teeth or to tartar; he has also cultivated several varieties of actinomyces from normal mouths, some of which are possibly identical with *Actinomyces bovis*. Inoculation of these cultures, or of material taken from human teeth, into animals, has given rise to progressive suppurative lesions having the clinical features of actinomycosis and producing granules with clubs. Naeslund has performed further work bearing on the relation of actinomyces to the formation of tartar and of salivary calculi. The growth of these organisms, and also of leptothrix, in saliva, gives rise to precipitation of lime salts, probably by a two-fold action; first, by a reduction of hydrogen-ion content of the saliva in the neighbourhood of the growth, so that lime salts cannot remain in solution; and, secondly, the filaments of the growth provide a framework for the deposition of these salts. Microscopical sections of tartar give evidence in support of the second hypothesis. There is no definite evidence, however, that actinomycosis ever results from the presence of salivary calculi.

The onset of the disease is rare under five years of age, which suggests a possible association with the appearance of dental caries. Mr. V. Zachary Cope, speaking at the same meeting, mentioned the usual method of spread of the condition by contiguity of tissues, although blood-borne metastasis from the appendix region can give rise to liver abscess; the lymph glands are never involved in man, but the local reaction is remarkable, large masses of tough fibrous tissue being formed, even at a considerable distance from the infecting mycelium, but without compression of blood-vessels. Three-quarters of the cases in man affect the head and neck, and the prognosis for this situation is good; next in frequency is the ileo-cæcal region, cases of which show an even chance of recovery; thoracic, pleural, and mediastinal actinomycosis are less common, but usually fatal; the liver, brain, or other viscera may receive metastatic deposits, and the skin may be affected primarily. The diagnosis presents difficulties, especially in the early stages, and could a serological test be devised it would be of great value in this connexion. Softening and pus formation may not occur for many weeks, and as certain diagnosis can only be made by microscopy of the granules, much valuable time is wasted before treatment is begun. Actinomycosis of the face and neck usually begins in the parotid region in man, but occasionally originates in the mandible. In the right iliac fossa the condition usually arises after removal of a diseased appendix, and produces a persistent sinus with indurated borders, or a large mass in the right iliac fossa.

An interesting case was described in this connexion by Sir Holburt Waring; the patient on examination was found to have a large, hard mass in the right ileo-cæcal region, which was diagnosed as carcinoma. On operation the tumour had the appearance of being due to actinomycosis; a portion was removed for section, and the diagnosis established microscopically. Potassium iodide in increasing doses, up to grs. 480 per day, resulted in a disappearance of the mass, and complete recovery. Twenty years later the man was readmitted to hospital for carcinoma of the stomach; he died while still in hospital, and post-mortem examination showed his cæcum to be perfectly normal in every way. Thoracic actinomycosis usually spreads from the mediastinum to the pleura and lung generally at the base, and forms a subcutaneous abscess from which the granules can be obtained.

There is no specific treatment for actinomycosis and allied conditions, either in men or animals. Potassium iodide in large doses usually gives the best results, and sometimes these results are dramatic, as in the case described by Sir Holburt Waring. Mr. McDougall found that his results among cattle were much improved by giving mercury biniodide in addition to potassium iodide. Vaccines have rarely shown striking results, though Mr. W. E. W. Riches described a case in which improvement under this form of treatment had been marked. X rays have a definite effect in leading to early softening of the lesion, and radium has been used with doubtful effect by some observers. Excision of large indurated masses and removal of bony sequestra are, of course, necessary in some cases; the injection of formalin is extremely painful, and the results obtained from it have not justified its use.

FRENCH VIEWS ON CONGENITAL SYPHILIS.

ONE of the most striking differences in the pædiatrics of England and France lies in the differing emphasis laid on inherited syphilis. On one side of the channel the Englishman limits this diagnosis to certain definite syndromes, always paying attention to the complement-fixation reactions in the blood, while on the other side the French have apparently decided to ignore the Wassermann reaction when it is negative, and blame the spirochæte for everything from squint to hammer-toe. This cleavage of opinion has created a "problem" which Dr. M. H. Grenet[1] seeks to solve. He holds that while a positive Wassermann reaction is of great value, a negative test, in the child even more than in the adult, must not influence the diagnosis in any way, and he lays great stress on close inquiry into the family history, particularly as regards miscarriages, premature labours, and frequent infantile deaths. Next he considers the subject of congenital malformations, and maintains that since the syphilitic virus can influence the ovum it may well be responsible for congenital heart disease, spina bifida, hydrocephalus, mongolism and hare-lip, the absence of the xiphoid cartilage being also a sign of some interest in congenital syphilitics. Other signs may be divided into "definite" and "probable," the former, he says, including epiphysitis, mucous patches, and fissuring of the lips, and the latter such manifestations as vomiting without other cause, defective growth, and rickets. English workers will at once disagree with him about this second group, despite the testimony of so great an authority as Prof. A. B. Marfan, concerning the part played by syphilis in rickets. Marfan and his followers believe that rickets beginning somewhat precociously and especially affecting the bones of the skull is nearly always due to syphilis, while if there is much enlargement of the spleen the rôle of the spirochæte is established. In older children Grenet recognises the same division into signs of certainty and signs of probability. The changes in the teeth, eyes, and joints, for example, are well recognised and universally accepted; but when the true Hutchinsonian teeth are passed over in favour of ill-defined tubercles on the molar teeth, diagnosis becomes a more shaky business; and the English physician will certainly hesitate before he accepts congenital syphilis as at all a frequent cause of bronchiectasis, endocrine disorders, epilepsy, or chorea. Of course, as Grenet points out, no one will deny that sometimes these have a syphilitic element in their production, but may it not be that certain stigmata and conditions, which the syphilologist scarcely ever sees except in the congenital syphilitic, the general physician sees quite commonly under very diverse circumstances? It is also important to keep a broad outlook about familial taints. As Grenet remarks, the inexplicable character of some pathological state is certainly not pathognomonic of its syphilitic origin, and if ancestral history is to be searched and scrutinised for possible syphilitic stigmata in order to explain a patient's complaint, how many of the best fan[illegible] really escape? Nor is the therapeutic test a very satisfactory one. No doubt it simplifies medicine a great deal to try what antisyphilitic measures will do before making a diagnosis, but such a method cannot commend itself

[1] Rev. de Méd., December, 1929, p. 951.

to conscientious clinicians. French views on congenital syphilis differ widely from what is accepted in this country, and the adoption of the French standpoint would be disastrous for the peace of mind of many a practitioner who has learnt what danger may lurk in even the most innocent remark about a "blood test."

CRIME AND INSANITY.

AT the Medico-Legal Society last Thursday the discussion on Dr. L. A. Weatherly's paper entitled A Half Century's Experiences and Opinions of a Medical Witness provided an opportunity for the constructive expression of the perennial conflict on the Rules in McNaghten's Case. By these rules, which are recognised as the common law on the question of responsibility for crime, the test of guilt is whether or not the accused knew what he was doing, and that what he was doing was wrong. The consensus of medical opinion has always been that the strict application of this test is at variance with psychological fact, and results in the infliction of the death penalty on many persons who are not responsible for their actions. Dr. Weatherly quoted as an extreme example the case of a hopelessly deluded person who was tried by Mr. Justice Bigham in 1908, for the purposeless and revolting murder of a woman on the highway. The judge directed the jury that if the prisoner knew that he was doing wrong, it did not matter that he did not know how wrong, nor that he suffered from delusions and hallucinations. A juror asked whether, if there was any doubt, the prisoner was entitled to benefit by it; the judge answered that he was not, but must satisfy the jury beyond reasonable doubt that he did not know he was doing wrong. Moreover, the judge held that if the prisoner knew he was doing wrong he was guilty of murder, no matter how insane he was. The accused was accordingly found guilty and sentenced to death, but the Court of Appeal substituted a verdict of "Guilty, but insane." Dr. G. A. Watson pointed out that the legal reasoning which led to the framing of the McNaghten rules contained a subtle fallacy. The lawyers assumed, he said, that the accused, who was by hypothesis insane, had been able to bring a sane reason to bear upon the question of whether he should commit the crime or not. They argued, "Supposing the delusion had been a fact, would the prisoner have been justified? If not, he is guilty." The amendment suggested by Dr. Weatherly is that each case should be decided on its merits, and that the medical witnesses for the defence should be allowed latitude to prove (1) that the accused was insane at the time he committed the act, and (2) that the act was an outcome, direct or indirect, of his insanity. If this principle were adopted, the suggestion made by Mr. Justice Humphreys that the psychiatrists really desire that cases involving questions of insanity should be tried by a panel of medical men would not be material. If full scope were given to the medical witnesses on both sides, the jury would probably in practice be fairly capable of assessing the balance of evidence. Mr. Justice Humphrey's argument that the jury actually disregarded the McNaghten ruling, so far from supporting its retention, seems to indicate very strongly that it should be amended as against good conscience. The anomalous situation at the present time is that, as in the case of Ronald True, an accused person may be found sane and guilty by the jury, but insane by the medical advisers whose subsequent opinion—presumably formed on much the same evidence as that presented at the trial—binds the Home Secretary. The issue has been somewhat obscured by the claim raised by certain members of both professions that a prisoner should be exempted if it could be proved he committed the crime under what has been termed an "irresistible impulse." Dr. Watson remarked very truly that lawyers were much afraid of this defence, and with reason, for, as he pointed out, it was highly improbable that there existed any such condition as an insanity which consisted solely in the impulse to commit a crime. Dr. Letitia Fairfield went so far as to say that the diagnosis of impulsive insanity was an exclusive invention of the solicitors for the defence, and was supported only by a very few experts who, when the McNaghten ruling was amended, would fade into a well-deserved obscurity. Dr. Watson attributed the concept to Dostoievski's classical work "Crime and Punishment" which, he held, though brilliant fiction, is wholly unfounded on psychiatrical fact. He believed that the whole idea at the back of the McNaghten ruling was that a man could be insane in one aspect of his mind and sane in others—in other words, a belief in a condition invented entirely by novelists, and popularly called monomania. The adoption of Dr. Weatherly's criterion of responsibility—whether the crime was a result of the accused's insanity—means a considerable degree of further public enlightenment on the facts of mental disease, but that enlightenment is proceeding rapidly, and there are good grounds for hope that a reform is not far distant. A necessary corollary would be the immediate examination by experts, as a matter of routine, of every person accused of a crime, and a lead has been given in this direction by the appointment of psychological experts to assist the local magistrates.

Dr. Weatherly also proposed another change: that of recognising degrees of murder. If a legal distinction were drawn between premeditated and atrocious murder, and murder committed under strong excitement, juries would no longer be induced to strain the rules of evidence by returning lenient verdicts when they felt that the accused should not be put to death. The distinction is recognised by the penal codes of many other countries, and, although it would not solve the problem of how far to admit or deny responsibility when mental disease is present, it would pave the way towards its ultimate solution. The speakers of both professions were unanimously in favour of such a reform, and Mr. Justice Humphreys hinted that it might not be long delayed.

THE USE OF ANÆSTHETICS IN LABOUR.

WE have received an eloquent letter from Mrs. Baldwin, Lady Dawson of Penn, Lady Ebbisham, and Lady Williams and Miss E. G. Dare, respectively hon. treasurer of Queen Charlotte's Hospital Anæsthetic Fund and Matron of the Hospital. In this letter a moving appeal is made for contributions to a fund having for its object the provision of anæsthetics during labour for mothers who cannot command the necessary fees. They write:—

> "The official statistics show that the maternal mortality rose from 2690 in 1927 to 2920 in 1928, the highest rate since these statistics were first compiled in 1911. Is it not time that the use of anæsthetics was extended? The mother who can afford it pays her fee for an anæsthetist, the mother who cannot, has, as a rule, to pay a fuller penalty of suffering. Surely we cannot stand by without protesting that every mother should be entitled to an anæsthetic if she wishes it.
>
> "That the administrative difficulties involved can be surmounted with a comparatively small expenditure has been proved by the experience of Queen Charlotte's Hospital, where 60 per cent. of the mothers have received this benefit since May last, as the result of the appointment of a single anæsthetist. The results there have been so excellent, not only from a humane, but also from a medical and administrative standpoint, that University College Hospital (obstetric branch) has now appointed a resident anæsthetist without waiting for the necessary funds to be collected."

The letter thus urges the raising of a fund for anæsthetics for mothers in hospitals and institutions in conjunction with the National Birthday Trust Fund (for the extension of maternity services), and the plea set forward has an inherent force. Subscriptions to this fund should be sent to Mrs. Stanley Baldwin, 10, Upper Brook-street, London, W.1, marked "Appeal Fund."

On Monday last an appeal was made in the *Times* by Mrs. Baldwin, the Duchess of Atholl, the Duchess

of Portland, Lord Carson, and Lord Buckmaster, along similar lines, pleading the cause of poor women bearing children, in London hospitals and infirmaries, who, they write:—

"have to pay the price exacted for the privilege of motherhood without the protection against its pains which women in their private homes generally enjoy.

In certain, if not in most hospitals, this fact is due to lack of funds, and we desire to make a wide appeal to women and to men to provide the means by which this condition can be ended or at least relieved. To attain this, a specially qualified person must be in attendance at each hospital, and for such provision a considerable capital sum is required both for the salary and for the extra accommodation. The Royal Free Hospital, as an instance, would gladly undertake that moneys so raised should be specially devoted to this purpose."

The second appeal, where contributions should be sent to Lady Balfour of Burleigh, 31, Bedford-gardens, London, W., will stimulate the wider scheme, and both call eloquently for public support.

The appeals appear contemporaneously with the placing before the Royal College of Physicians of London the report of a strong committee on the very question, which has not yet been made public. The committee, while agreeing that every effort should be made to relieve from pain any woman in labour, are obliged to point out that the indiscriminate use of analgesics and anæsthetics has itself distinct dangers, especially when other than institutional treatment is in question.

THE ÆTIOLOGY OF PSITTACOSIS.

THE possible transmission from parrots to man of a serious and often fatal disease resembling severe enteric fever in its early stages and complicated by involvement of the lungs, was recalled to our readers last summer by Dr. A. P. Thomson.[1] Since then cases of this disease have been reported from many sources and a special investigation has recently been undertaken at the London Hospital into its ætiology. A Gram-negative bacillus, which has been regarded as the causal organism, was isolated by E. Nocard in 1893 and called *B. psittacosis*. This bacillus belongs to the salmonella group and is now accepted as identical with *B. aertrycke*. It has not, however, been recovered from more than a small proportion of the cases in which circumstantial evidence has pointed strongly to infection from parrots, and moreover, as Dr. Thomson pointed out in opening a discussion reported on another page, the results of agglutination tests have been extremely irregular and capricious. Dr. Bedson, Dr. Western, and Dr. Levy Simpson (see p. 235), in the course of investigations on 12 human cases diagnosed as psittacosis and six parrots connected with these cases, have been unable to obtain any evidence, bacteriological or serological, of the presence of any member of the salmonella group. They decided therefore to approach the problem from a different angle and report that, using the budgerigar as experimental animal, they have been able to demonstrate the presence of a filtrable virus in the organs of a parrot which had been responsible for two human cases. No quantitative experiments have yet been carried out but the virus seems to pass readily through Chamberland L1 filter candles and passage in budgerigars with filtered material has been realised. The parrot tissues are still virulent after being kept for 20 days in 50 per cent. glycerol saline in the cold. The possibility that this virus is the source of the disease in man is suggested by their experiments which are being actively pursued. Dr. R. Hutchison said at the discussion that the response to his letter asking for material had enabled the workers at the London Hospital to get into touch with material from four fresh cases, and we would remind our readers that parrots suspected of conveying the disease will be gratefully received by Dr. Western at the Bacteriological Department, London Hospital, E.1.

[1] THE LANCET, 1929, ii., 115.

TUBERCULOSIS STUDY SCHOLARSHIPS.

DURING the summer of 1928 a number of Canadian medical men, engaged in tuberculosis work, made a tour of Great Britain and the Continent, visiting the more important tuberculosis institutions, studying methods of treatment, and becoming personally acquainted with their European and British colleagues. They were enabled to make this tour, which was a great success both socially and professionally, with the help of scholarships granted by the Sun Life Assurance Company of Canada. The Company has now offered through the Joint Tuberculosis Council 50 scholarships of £100 each to British medical men, engaged in tuberculosis work, who would like to pay a return visit this year to Canada and the United States. The duration of the tour will be from Friday, August 8th, to Friday, Sept. 12th. The itinerary which has been planned by Dr. R. E. Wodehouse, secretary of the Canadian Tuberculosis Association, includes Quebec, Montreal, Ottawa, Toronto, Muskoka, Winnipeg, Ninette, Chicago, Detroit, London, Hamilton, Buffalo, Syracuse, and New York. Visits will be paid to many notable centres in both Canada and the United States and the scholars will reach Winnipeg at the time of the annual meeting of the British Medical Association. The cost of the tour, including personal expenses, is estimated at about £150, of which £50 will have to be found by the successful candidate or the local authority which employs him. Married scholars may be accompanied by their wives, but for these and other dependents the full passage money must be paid. Candidates will be approved by a selection committee consisting of Sir Henry Gauvain, chairman of the Council, Dr. A. S. McNalty and Dr. J. A. Glover, representing the Ministry of Health, Prof. S. Lyle Cummins, representing the National Association for the Prevention of Tuberculosis, Dr. Lissant Cox, Dr. James Watt, and Dr. Ernest Ward, hon. sec. of the Council. Applications should be addressed to Dr. Ward, at 123, Torquay-road, Paignton, not later than Feb. 14th. Each successful candidate will be required to pay a deposit of £5 within 14 days of the allotment of the scholarship, and the remaining £45 one month before the tour begins.

NEWS has just reached us of the death in Cairo, on New Year's Day, of Dr. C. Floyd Haviland, superintendent of Manhattan State Hospital, Ward's Island, New York. Dr. Haviland was formerly State Commissioner in Mental Hygiene, and in 1926 President of the American Psychiatric Association. He was in his 55th year, and his unexpected decease cuts short a career of great vigour and usefulness.

WE regret to record the death of Dr. Louis Fournier, chief physician of the Hôpital Cochin, Paris, following an operation. Dr. Fournier, who was 62 years old, had been closely associated with Levaditi in work on new remedies for syphilis, and especially in testing the results of bismuth derivatives.

INDEX TO "THE LANCET," VOL. II., 1929.

THE Index and Title-page to Vol. II., 1929, which was completed with the issue of Dec. 28th, is now in preparation. A copy will be sent gratis to subscribers on receipt of a postcard addressed to the Manager of THE LANCET, 7, Adam-street, Adelphi, W.C. 2. Subscribers who have not already indicated their desire to receive Indexes regularly as published should do so now.

UNIVERSITY OF MANCHESTER JUBILEE.—In connexion with the celebration of the Jubilee of the Victoria University and the eightieth anniversary of the foundation of the Owens College, honorary degrees will be conferred at the University on May 23rd. Among other recipients will be Dr. James Lorrain Smith, F.R.S., Professor of Pathology in the University of Edinburgh.

The Clinical Interpretation of Aids to Diagnosis.

A Series of Special Articles contributed by Invitation.

LXI.—INTERPRETATION OF REPORTS ON LESIONS OF THE EYE.

PART I.*

IN the interpretation of bacteriological reports in eye work it must be remembered that the organisms take on a special significance when found in the eye. For example *Staphylococcus albus* and *Bacillus xerosis* can be found in most normal healthy conjunctivæ. Thus in the routine examination of conjunctival sacs, which should always be carried out before cataract extraction, and preferably before all intra-ocular operations, the presence of these organisms may be neglected and operation may be proceeded with without fear of sepsis. Organisms, such as *Staphylococcus aureus*, streptococci, or pneumococci, however, are pathogenic, and their presence forbids operation. Certain other organisms, such as the pneumobacillus, *Micrococcus catarrhalis*, and Morax-Axenfeld diplobacillus, are of less importance; if only two or three colonies are present after 48 hours' incubation operation need not be postponed, but it is advisable to take some extra precautions, such as washing out the conjunctival sac with (say) 1/10,000 hyd. perchlor. or 1 in 8000 hyd. oxycyanide lotions. I have never seen a panophthalmitis due to the Morax-Axenfeld bacillus or to the *Micrococcus catarrhalis* and with the pneumobacillus only following gross infection. Bacterial reports on cases of conjunctivitis are of much help, since it is almost impossible, even for the expert clinician, to be sure of the organism causing the trouble, and treatment is much more satisfactory when directed against a known organism than when carried out on so-called "general lines."

The Morax-Axenfeld Diplobacillus.

Morax-Axenfeld diplobacillus is the cause of angular conjunctivitis, a chronic condition which is very often associated with a secondary infection by *Staphylococcus aureus*. The clinical importance of this association lies in the fact that when both these two organisms are reported as present, zinc alone will seldom affect a cure, but oxycyanide of mercury should be used as well; fortunately these chemicals can quite well be prescribed together. Morax infections do not always cause angular conjunctivitis and probably never do so until the organism has become well established. It is quite common to find this diplobacillus in early cases of conjunctivitis without any sign of inflammation at the angle of the eye. The organism can also cause an ulcer of the cornea, which is usually amenable to treatment. I have never seen an intra-ocular infection due to the Morax-Axenfeld diplobacillus.

Koch-Weeks Bacillus.

This organism is the cause of acute muco-purulent conjunctivitis which generally clears up readily with treatment. A report of the presence of this organism will sometimes bring considerable relief to the mind of the practitioner, who may, with justification, have suspected a gonorrhœal origin for the disease.

Pneumococcus.

During the last 15 years the pneumococcus has been found with increasing frequency in all sorts of eye conditions and it is now almost the commonest organism found in diseased eyes. It is found in eyes looking perfectly healthy, and in this fact lies the danger of cataract extraction without previous bacteriological examination of the conjunctival sacs. The pneumococcus is the organism most frequently associated with operative and post-operative infections in cataract cases, and is thus responsible for most of the eyes lost after operation. Now that gonorrhœal ophthalmia in the new-born baby is comparatively a rare disease, the pneumococcus is the organism most frequently found in ophthalmia neonatorum and is often associated with many other organisms. The infection readily clears up as a rule with mild treatment. Acute and chronic infections of the lacrymal sac are almost always due to this organism. Chronic sac infections are always a potential source of danger to the eye, since some injury may damage the epithelium over the cornea and allow the pneumococcus to penetrate and cause an ulcer.

Gonococcus.

As has already been stated, when the gonococcus is found in the conjunctiva of an adult it must be remembered that the infection is almost invariably carried from an already existing urethritis. Vaccines are useful in adults, but are of no use in infants. It is an interesting fact that I have never seen ophthalmia during an epidemic of vulvo-vaginitis in children's wards. The gonococcus when found in eye work is always of serious import, and expert treatment must be obtained at once.

Staphylococcus Albus, Citreus, Aureus.

While in eye work *Staphylococcus albus* is generally non-pathogenic, *Staphylococcus citreus*, which is rarely found in eye work, is more virulent. The presence of *Staphylococcus aureus* in a conjunctiva before operation means that the operation must be put off and the conjunctiva treated. Oxycyanide of mercury is one of the best antiseptics for staphylococcal infections and may be used as a lotion (1 in 8000 to 1 in 5000). Fresh cultures should be made after a course of treatment and when the conjunctiva has been free from antiseptic for 24 to 48 hours. *Staphylococcus aureus* is a frequent cause of acute and chronic eye conditions and is frequently associated with other organisms, especially the Morax-Axenfeld diplobacillus. Vaccines are of considerable value in the treatment of chronic staphylococcal infections of the eye, especially chronic styes and blepharitis.

Diphtheria Bacillus.

Membranous conjunctivitis due to the Klebs-Löffler bacillus is a comparatively rare condition. The diagnosis is often difficult to make either clinically or bacteriologically. Clinically it is difficult, because all acute bacterial infections may cause a membrane, and over-treatment must not be forgotten as a cause of a membranous conjunctivitis. From the bacteriological point of view the diagnosis is complicated by the technical difficulties of differentiating the diphtheria bacillus from the *Bacillus xerosis*; sometimes this is impossible without resort to animal inoculation. The prognosis of diphtheritic infections, once diagnosed, is good. The local application of anti-diphtheritic serum to the conjunctiva is often of value combined, of course, with its general administration. When the decision is made to use serum, it should be given at once and in large doses. The paralysis of accommodation which is an occasional complication of diphtheria is attributable to the general infection, is no more likely to occur if bacteria have been found in the eye.

Bacillus Pyocyaneus.

B. pyocyaneus is a rare cause of eye disease but when it does occur it is almost always fatal to the eye. In nearly all the cases of eyes lost due to infection with this organism I find that the infection has been conveyed direct from discharging ears, since *B. pyocyaneus* is frequently found in the discharge from chronic diseased ears. It is always advisable to examine the ears of patients awaiting intra-ocular operation, especially those of children. The loss of eyes through infection used to be explained away in the old days as being due to

* Part II. will appear next week.

metastatic infection, but we now know that is rarely the cause. Generally infection takes place during or just after the operation.

Micrococcus Catarrhalis.

This organism is practically non-pathogenic in eye work. It is found in healthy looking eyes examined before operation, in patients suffering from catarrh, and quite frequently in infants. I would like to point out that in these cases the infection comes from without, in adults generally from spray infection during sneezing or nose-blowing. Infection cannot spread to the conjunctiva from the nose by way of the nasal duct and lacrymal sac unless these passages are severely damaged by disease or operative interference. In infants infection by catarrhal organisms such as *Micrococcus catarrhalis*, pneumobacillus, and pneumococcus is generally conveyed by the use of the family handkerchief or its substitute to wipe away a little muco-pus, the result of the chemical irritation of the antiseptic treatment adopted at birth. The infection responds readily to the mildest treatment.

Streptothrix Infections.

Infections of the conjunctiva by a streptothrix are extremely rare, but streptothrix infections or concretions in the canaliculi are comparatively common. The concretions are most frequently found in the lower canaliculus, but I have seen them both in the upper and lower canaliculi at the same time. They vary in size from microscopic particles to hard gritty masses of considerable size, as large as a $\frac{1}{4}$ of an inch by $\frac{1}{8}$ of an inch.

Small concretions can be squeezed through the punctum, but in order to extract the large ones it is necessary to slit up the canaliculus so as to get the whole concretion or aggregation of concretions away. They seldom recur and the streptothrix never invades the surrounding tissue. A chronic conjunctivitis, with pus, which resists all ordinary treatment, and especially when more pus is present than the severity of the conjunctivitis seems to warrant, suggests the advisability of trying the canaliculi for concretions. It should be remembered that it is often possible to syringe past even quite a large concretion.

Spirochæta Pallida.

Primary syphilitic sores on the eyelids are uncommon, but the possibility of their occurrence must always be borne in mind. The sore may be entirely on the conjunctival surface or on the skin of the lid, and I have seen two cases of chancres on the caruncle. The diagnosis is generally made easy, since the spirochæte is readily found by dark-ground illumination. No organisms of the spirochæte type are likely to be found in the conjunctiva, so that chancres when present are easier to diagnose with certainty at a glance than those on the lip. The presence of an enlarged preauricular gland should always be looked for.

Vaccinia Virus.

Many years ago Prof. John Eyre watched me busily examining a sore on a woman's eyelid with dark-ground illumination, Indian ink, and so forth, and then suggested that I should examine the left arm of the infant she was carrying. I found the infant had three beautiful vaccination pustules and I then realised I was examining an accident vaccination on an eyelid. I have since seen quite a number of such cases. Anthrax pustule in the early stage may look very like an early vaccination spot though, of course, the microscopical examination would immediately make the diagnosis clear.

B. Tuberculosis.

Tuberculous infection of the conjunctiva cannot, as a rule, be diagnosed with certainty without a guinea-pig inoculation, though the bacillus can sometimes be found in scrapings or fragments of the suspected lesion. These infections of the conjunctiva by the tubercle bacillus are almost invariably airborne or derived directly from tuberculous material—e.g., spray infection from sputum or direct infection from tuberculous milk in milkers or cowmen. Prognosis in these cases is good if advantage is taken of the combined treatment by tuberculin, surgery, and light treatment, but tuberculin should always be used for a period before the condition is dealt with surgically.

Spring Catarrh.

This is a condition of the conjunctiva associated with an excess of eosinophile leucocytes in the blood stream and the presence of these cells in the conjunctival secretions. Sometimes practically all the cells in the conjunctival secretion are eosinophiles. In cases seen during the winter, and in treated cases, however, only a few eosinophiles may be present. In my experience the presence of eosinophiles in the conjunctival secretion is pathognomonic of spring catarrh. The condition is probably due to protein sensitivity of some kind. In a family now under my care the father suffers from severe angioneurotic œdema, the mother has asthma and urticaria, one child has spring catarrh, and the other hay-fever.

S. H. BROWNING, M.R.C.S. Eng.,
Bacteriologist to and Lecturer on Bacteriology and Medical Officer i/c V.D. Dept. to the Royal London Ophthalmic Hospital.

Special Articles.

BIOLOGY AND THE TRAINING OF YOUTH.[1]

BY C. C. HENTSCHEL, M.Sc.,
DEMONSTRATOR IN BIOLOGY AT ST. BARTHOLOMEW'S HOSPITAL MEDICAL COLLEGE.

AT the present day there has come a great change in the conception of what should be taught to school-children. Until recent years, chemistry and physics were the only scientific subjects that formed part of the school curriculum. Biology was practically unknown as a school subject before the beginning of the twentieth century, and up to the war it was only taught in a handful of the larger public schools, and then chiefly to a few boys who were being prepared for the first M.B. examination. In many girls' schools botany was taught, but rarely on modern scientific lines, and generally without any proper thought-out plan. To-day schools are increasingly taking up the study of biology all over the country, but as yet we are in these islands far behind countries such as Japan, the United States of America, and Sweden.

A Shortage of Teachers.

In former days biology was to a great extent in the hands of amateurs, whose pioneering efforts may be said to have paved the way for the rapidly increasing army of men and women who are now making biology their livelihood. But there still appears to be a shortage of biologists, especially for the teaching profession. This has led to a vicious circle. Owing to the lack of trained biologists, posts which might have been created have not been made, because it was realised that there was no great likelihood of their being filled by suitable persons. This lack of posts has, in turn, had the effect of preventing people from taking biological subjects in a university course, since there seemed no prospects in that line. It is obvious that steps must be taken to break into this circle by the action of the Universities in connexion with the proper Government authorities.

If biology is to be taught in schools, it must be taught by men and women who have had a thorough training in the subject by means of a suitable university course. Up to the present, this teaching has

[1] Abstract of a lecture given under the auspices of the British Social Hygiene Council at the Central Hall, Westminster, on Jan. 23rd, 1930.

been at a great disadvantage, as the job of taking the biology classes has sometimes been pushed on to some unfortunate master or mistress who has little or no knowledge of the subject, and therefore has to "mug" it up for the occasion. So long as this state of affairs obtains, the teaching of biology must be almost worse than useless, for biology is not a subject that can be taught from a "crib" or a text-book, for the teacher must depend to a certain extent on the resources that he has around him. Chemical and physical experiments are more or less stereotyped, and will give the same result anywhere, but the biology teacher will have to rely on what he can obtain from the surrounding country in order to illustrate his points. A teacher reliant on text-books cannot do this, and unless well grounded in his subject will be unable to adapt himself to his environmental conditions.

Six Central Ideas.

Although the details of the teaching of biology in schools must be left to the individual teacher, there should be set forth certain main ideas around which he can build. The following points are in close agreement with the recommendations of various committees of biologists that have been sitting during the last few years to consider the matter.

1. *General description of the phenomena of life.*—This would include an account of the chief vital processes, without any great elaboration of physiological detail. A description of metabolism would be necessary in order to explain the necessity for food and what happens to it after it has entered the body (it is surprising how ignorant most people are of the functions of the alimentary canal and its associated glands), together with an explanation of the meaning of respiration. A comparison might be made between the anabolic processes of animals and plants, showing the dependence of the former on the latter for their supply of food. Lastly, and by no means least, an account of the methods of reproduction of animals and plants can introduce a difficult subject in a way which is not only scientific and easy of comprehension but, what is more important, devoid of offence and nastiness. This is one of the greatest points in favour of school biology, as it is possible by this method to impart "sex education" without the young mind being consciously brought to bear on the subject. It is surely much better that sex knowledge should not be acquired as a separate subject, but as part of the general biological course, wherein the evolution of sex can be clearly shown, starting with the purely asexual reproduction of amœba, and leading by way of the mention of such semi-sexual phenomena as the conjugation of paramecium to the complete sexual reproduction of some of the simpler metazoa, such as hydra and the earthworm, and ultimately to that of the vertebrates. The teaching of biology in schools is worth while for this alone.

2. A short account of the *theories underlying biology*, such as evolution, should be offered, together with a simple account of the laws of heredity as discovered by Mendel.

3. The history of some of the *great pioneering biologists* of the past should be included, such as Aristotle, Buffon, Linnæus, Darwin, and Pasteur, to take a few names at random. The interest aroused by the study of personalities helps enormously to facilitate the teaching of any science, and it is a great pity that the ordinary teaching of history in schools tends nearly always to omit references to the fathers of modern scientific achievement.

4. A study of the modes of animal and plant life, especially parasites, would form the introduction to instruction in *hygiene*. A generalised account of the methods of infection by bacteria and of their effects upon the body might have a very great influence upon the health of the nation. Too much disease is the result of ignorance.

5. The teaching of biology is valuable as an educational force by training the *powers of observation*; this may easily be cultivated by simple experiments which the children may be allowed to perform for themselves, and by the keeping of animals and plants under their care.

6. Lastly, the *economic value* of biology might be stressed in its applications to agriculture, fisheries, tropical medicine, and so forth, with a view to making the citizens of the future realise that biology is no longer of mere academic interest, and at the same time showing the possibilities of a biological career in these fields to boys and girls with the correct aptitude.

Cultural and Vocational Value.

The teaching of biology in schools will not, of course, be a panacea for all our economic ills, but it appears certain that a wider knowledge of these facts will undoubtedly have a considerable beneficial effect. It is, at last, realised that biology has both a cultural and a vocational value in the education of youth. Up to the present time, men and women have gone through life with the most appalling lack of knowledge of themselves and the vital processes in their bodies. This ignorance is still a drag on the teaching of biology; there are still parents who will object to their children knowing the elements of biology and physiology, and hold that a knowledge of one's inside is "rude." But if these facts are taught scientifically and without partiality, there will grow up a generation in which these facts form part of the ordinary knowledge of the average citizen, who will thus have in his mental equipment a true understanding of things as they are, which will, let us hope, enable him to live a healthier and nobler life and be the progenitor of a better race.

THE ASPIRATION METHOD OF TREATING DIPHTHERIA.

THE Metropolitan Asylums Board recently sent Dr. Alexander Joe to America to investigate the treatment of diphtheria employed at the Willard Parker Hospital in New York. Dr. Joe also visited hospitals and laboratories in Montreal, Ottawa, Toronto, Boston, and Washington, and discussed problems with their staffs. The Commissioner of Hospitals for New York City made arrangements for Dr. Joe to hold a temporary internship in the diphtheria service of the Willard Parker Hospital. During the three weeks that he was there he saw the eleven cases of croup admitted, and the use of the aspiration method of treatment, and also investigated the statistical material available.

The Method Practised at Willard Parker Hospital.

Every patient showing clinical signs of croup is examined laryngoscopically, and if there is membrane in the larynx or trachea an attempt is made to remove it by suction. The patient is placed on an operating table and firmly wrapped up in a sheet so as to prevent him from moving. The nurse holds him in a suitable position for laryngoscopy, with a sand-bag about two inches thick under his shoulders and his head tilted backwards slightly over the end of the table. Another nurse controls movements of the body. A direct laryngoscope is then inserted. The type generally used is the Jackson pattern, in the two sizes for infant and child respectively. The instruments are not plated, because after much cleaning the plating may become rough enough to damage the mucous membrane, or pieces may even scale off and stick in the trachea or larynx. Each laryngoscope is supplied with two light carriers and two bulbs and a supply of spare bulbs is kept in reserve. The operator holds the instrument in his left hand and opens the mouth with a tongue depressor. The laryngoscope is passed in at once and kept in the mid-line and as vertical as possible. The epiglottis is hooked up by the lip of the laryngoscope, which rests on the upper teeth in the mid-line; in this way a good view of the larynx is obtained. An artery forceps holding a swab is

passed along the lumen of the laryngoscope in order to obtain material for culture.

If suction is to be applied an aspirating tube is passed until its tip lies about an inch beyond the vocal cords. These suction tubes are of a special make and cannot be obtained from the ordinary instrument-maker. They are plain brass tubes 14½ inches long and, about six inches from the proximal end, they are bent at an angle of 140 degrees so that the surgeon's hand does not obstruct his view. The proximal part is widened to make a handle, on which is provided a nipple for connexion with the rubber suction tube. The tip of the tube is carefully bevelled off. Like the laryngoscopes, the tubes are unplated. They are used in three sizes: (1) small; internal diameter of main stem 3 mm.; external diameter, 5 mm., internal diameter of tip 2 mm., and external diameter 4 mm.; (2) medium; external diameter of main stem 6 mm., and of tip 5 mm., internal diameter of tip 3 mm.; (3) large; external diameter of main stem 7 mm., and of tip 6 mm., internal diameter of tip 4 mm. Dr. J. D. Smith, the director of hospitals at the Willard Parker, prefers a special type of tube which resembles a male catheter; it has a blind end, with a hole measuring 10 by 3 mm., placed 12 mm. from the tip. The portable suction apparatus is run off the hospital current and two sets should be available in case of emergency.

Between the applications of the suction tube, water is drawn through it, so that its lumen is kept clear and the surgeon can see how much membrane has been removed. Finally, the larynx is inspected, and if there is a raw, oozing surface it is swabbed with adrenalin.

A supply of sterile laryngeal swabs is kept in readiness for making direct cultures and for applying adrenalin. The swabs are inserted by means of clamped artery forceps. To prevent the wool becoming detached in the larynx the pledget is fixed to the swab stick by collodion.

The nose and mouth of the operator are protected by a mask and his eyes by plain glass spectacles. The whole operation only takes a few minutes and should not cause the patient more than a little discomfort. No anæsthetic is necessary. As soon as the procedure is finished the patient is sent back to bed and given diphtheria antitoxin.

Advantages of Aspiration.

The first advantage claimed for this method is the accurate diagnosis which can be made after direct inspection and direct culture. The diagnosis also aids prognosis; the workers at the Willard Parker Hospital believe that laryngeal diphtheria has a better prognosis than other forms of acute laryngitis with obstruction. Secondly, the direct removal of the membrane by suction restores the air-way which has been partly or completely blocked by it. At the stage at which patients usually come to hospital the membrane is detached easily and there is little œdema and no hæmorrhage. Earlier in the illness there is usually a good deal of œdema and the membrane is very adherent; if the symptoms are not urgent expectant treatment is adopted. Later in the illness, when relief is urgently needed, direct intubation is performed, but suction, its supporters claim, often obviates the necessity for intubation, and in any case diminishes the incidence of broncho-pneumonia.

Dr. Joe's report gives the tables which he was able to compile from the records of the Willard Parker, Kingston-avenue, and Queensboro Hospitals. These institutions have 864 beds between them. Unfortunately the figures only date from 1927. At the Willard Parker Hospital there was a progressive decrease in the death-rate of intubated cases of diphtheria from 54 per cent. in 1922 to 25 per cent. in 1926, followed by a considerable drop—to 16·6 per cent.—in 1927. Making allowance for the reduced severity of diphtheria from 1922 to 1926, Dr. Joe thinks that at least part of the decrease was fairly attributable to the introduction of the suction method. Since 1927 the percentage of mortality has shown an increase to 28·5 in 1928, and 37·5 in the first nine months of 1929. Dr. Joe points out that these figures are not quite fair to the suction method, as they only represent the percentage of deaths after intubation, and the suction method has been steadily reducing the number of cases which require intubation. Moreover, the increasing accuracy of diagnosis may also be related to the increased death-rate. The figures do not supply an answer to the question of how far the new method has reduced the need for intubation. Before 1927 laryngeal diphtheria was not separated from the other cases of diphtheria, but there has been a steady fall in the percentage of all cases of diphtheria which required intubation. Since Dr. Joe's return to England he has received from Dr. Smith the information that in the year 1918–19 the Willard Parker Hospital admitted 697 cases of croup, and that of these 286, or 41 per cent., required intubation, while the mortality after intubation was 41·6 per cent. In 1928, 407 cases of laryngeal diphtheria were admitted; of these, 77, or 4 per cent., only were intubated.

Cases Seen Personally by Dr. Joe.

Of the 11 cases seen by Dr. Joe while he was in New York six were finally diagnosed as laryngeal diphtheria. Two of them were not treated by suction as there was no membrane in the larynx; two more had a moderate amount of obstruction, but Dr. Joe remarks that he would not have considered them serious enough for operative interference, while the remaining two were very severe, and he would have performed tracheotomy or intubation on them at once. The two milder cases gradually recovered without any dramatic alleviation of their symptoms, but the two severe cases demonstrated the value of the aspiration method very forcibly, and Dr. Joe gives the details of them.

The first was a boy, aged 5, who had extensive membrane on the fauces, and was exhausted and livid, with a rapid, thready, pulse and marked recession of the soft parts. Laryngoscopy revealed a good deal of membrane on the epiglottis and larynx and flapping about in the trachea. On the first application of suction, several pieces of membrane were brought out, and the second application removed a complete cast of the trachea and proximal half-inch of both bronchi. All obstructive symptoms disappeared, the patient's colour and pulse improved, and he was asleep when carried out of the theatre. Symptoms of moderate obstruction appeared again 22 hours later; aspiration was repeated, several more fragments removed, the symptoms again completely relieved, and recovery was uneventful.

Dr. Joe's conclusion is that the method is safe and involves, in the hands of a skilled operator, little more than temporary discomfort, and certainly much less shock than tracheotomy. He sees no reason why aspiration should not be employed as an adjunct to tracheotomy as well as to intubation.

WESTMINSTER HOSPITAL.

OPENING OF THE RADIUM TREATMENT ANNEXE.

THE Radium Annexe, which was formerly opened by Viscount Lee of Fareham last Wednesday, Jan. 29th, at 66, Fitzjohn's-avenue, London, N.W., owes its origin to the fact that while public recognition of the value of radium was still lacking two munificent gifts, one from Mr. Austin Taylor, later chairman of the hospital, the other from the Prudential Assurance Company, enabled progress to be made in 1925 with the radium treatment of certain types of cancer. The house committee of the hospital desiring, in 1927, to make the treatment available to all who might benefit from it, an appeal for funds realised nearly £25,000, which was immediately used for the purchase of radium, and by the end of 1928 the hospital possessed three-quarters of a gramme in the form of needles and one gramme which could be used as a unit for the treatment of forms of cancer which had hitherto been regarded as beyond surgery. The problem of accommodation for the increasing numbers of patients then arose, and

it became clear that further progress depended upon the coöperative efforts of teams of specialists and surgeons, pathologists, radiologists, physicists, and technical engineers, all working together under one roof. To meet this twofold need it was resolved to establish a separate Annexe, and this was partially made possible by two anonymous donations of £4000 and £5000 each. A building in Fitzjohn's-avenue, Hampstead, was purchased, and plans were made for its adaptation and equipment. Funds were quickly forthcoming, and there is a list of 845 founders, headed by the name of H.R.H. the Prince of Wales. The National Radium Commission recently decided to entrust to the hospital four grammes of radium, on loan from the Union Minière Belge, for use in a single unit. This "bomb" has now been purchased by the Radium Trust and will be in use day and night at the Annexe.

Accommodation.

In the *basement* is (1) a pathological laboratory, in which portions of growth are microscopically examined to determine their original nature and the effects upon them of radiation; examinations of blood are also conducted to serve as a measure of the amount of radiation received by a patient—experimental work on the genesis of cancer is being undertaken; (2) a biochemical laboratory: determination of a patient's tolerance to sugar is here conducted as a measure of his or her reaction to irradiation—an investigation into the cause of cancer from the point of view of the action of fat-soluble agencies is also being carried out; and (3) a physics laboratory: here research is being conducted with a view to the determination of the best means of utilising the supply of radium both in the "bomb" and in the form of needles in order to obtain the maximum destructive power on a growth without injury to the normal surrounding tissues. Here is also (4) the emanation room, containing apparatus for the preparation of radium "seeds," and (5) the deep X ray set room, containing the apparatus necessary for generating at 230,000 volts the X rays used in the deep therapy departments.

On the *ground floor* is (1) the radium bomb room, lined with barium for the protection of workers in adjacent rooms; by means of specially constructed apparatus its rays are directed on two patients simultaneously; (2) the deep X ray therapy department for the irradiation of deep-seated malignant growths, to be compared with irradiation by means of the bomb; (3) the X ray diagnostic department, chiefly used for locating and localising tumours preparatory to their treatment; (4) the dark room, the walls of which, in accordance with modern practice, are painted cream and all work is done by reflected light. On this floor is the male ward with six beds and the female ward with four beds for those unable to contribute, as well as the medical officers' consulting room.

On the *first floor* are seven rooms for the accommodation of paying patients, one three-bedded and one two-bedded ward for the accommodation of those able to contribute not more than £3 3*s*. to £4 4*s*. per week (no medical fees being charged); also the operating theatre, sterilising room, and anæsthetic room.

On the *second floor* is accommodation for two sisters, ten nurses, and four maids. The nurses have their dining and sitting rooms on the ground floor.

Opening Ceremony.

In asking Lord Lee to open the Annexe, the chairman of the hospital, Mr. K. A. Wolfe Barry, said that although separated geographically, the Annexe would be as much a part of the hospital as any ward or special department of the main building. Their surgical staff, after visiting those centres on the Continent where radium treatment of cancer was being practised, had persuaded the governors of the hospital to take their courage in both hands and to establish a separate department where, alongside treatment by all radium methods, research might be carried out not only into the cause of the disease but also, what was as important, into improved methods of technique. The building, with 22 beds for patients, special rooms for a radium bomb and deep X ray therapy, a theatre, accommodation for the nursing and domestic staff, and all the necessary laboratories for routine and research purposes, was being opened free from debt, although they were not without anxiety for maintenance and running cost. If they had the means they would house the nursing staff in an adjacent building and give up the top floor to further accommodation for patients. This was, he added, the first time that such a mass of radium as four grammes had been used as one unit in this country, and the hospital was proud to be entrusted with it.

Administrative Committee.

The committee which has been selected to administer the Annexe consists of eight members, two of them being surgeons to the hospital—namely, Mr. R. H. Thorpe (chairman), Mr. H. M. Clowes (vice-chairman), Mr. Wolfe Barry and Lieut.-Colonel H. C. Bulkeley (ex officio), Mr. William Turner, F.R.C.S., Mr. E. Rock Carling, F.R.C.S., Mr. J. D. C. Couper, and Major S. R. Stott.

NOTES FROM INDIA.

(FROM OUR OWN CORRESPONDENT.)

Medical Research.

THE recommendation of Sir Walter Fletcher's Committee that Dehra Dun should be selected for the Imperial Research Institute seems now to have been definitely adopted, in spite of the local claims of the presidency towns. There has been acrimonious discussion in the Legislative Assembly and elsewhere, and no doubt there would be advantages in the vast amount of clinical material which the hospitals in the large cities are in the position to supply, but the existing research laboratories in Calcutta, Bombay, and Madras will still have their opportunities, and the recently issued report for 1928 of the Haffkine Institute in Bombay furnishes a good example of the variety of work with which they have to deal. During the year under report the Institute has been investigating sprue, various forms of anæmia (particularly in relation to pregnancy), and tuberculosis. An inquiry has been conducted into the possibility of improving the mode of preparation of plague vaccine, with which Bombay supplies the whole of India, and the examination of indigenous drugs, which has now been going on for some years has been continued, as well as an inquiry into the factors which give rise to earth-eating. The plague investigation has not led to any modification in the process of manufacture, but as so often happens in such cases a result has been indirectly arrived at which will prove very useful. The discovery that blood agar is the best medium for the growth of the plague bacillus has facilitated the detection of contaminating organisms in the vaccine. Anæmia is very prevalent in Bombay, and the researches have shown that the forms associated with sprue and pregnancy bear a close resemblance to pernicious anæmia. It is thought that the anæmia of pregnancy is not a distinct entity, as has sometimes been suggested. The Institute also serves as a centre for antirabic treatment. The report closes with an expression of regret that the Institute is still cramped for funds, and that no further advance has been made in the direction of establishing a school of tropical medicine in connexion with it.

Cholera in a Hill Tract.

Evidences of progress in medical work are to be seen just now in the Punjab, where a large number of fresh rural dispensaries have been established during the last few years, and the public health report of the province for 1928 is full of interest. The year was an exceptionally healthy one, the death-rate being 24·72 per mille, as against a birth-rate of 46·30—

relative figures which may well cause serious reflection to those who have to consider future problems of population; problems which are only partly solved by the generally excessive infantile mortality. Reports such as this bring out increasingly the fact that it is not so much the more dreaded and tragic diseases like cholera, plague, and small-pox, as the less conspicuous "fevers" which account for the heavy mortality in most rural areas in India. These three diseases, which probably inspire most awe, contributed in this case only some 19,000 deaths out of a total of 507,234, whereas "fevers" accounted for over 300,000, the 1921 census population, on which the report is based, being 20,507,606. In the mind of a young Englishman going out to India for the first time snakes and plague would probably bulk much more largely than malaria and dysentery, but the writer, after 32 years of medical work in the country, has never come across a European who has been bitten by a snake, and has seen only a very few who have contracted plague. On the other hand, he has been present at the funerals of many who have succumbed to the less conspicuous diseases. Cholera, plague, and small-pox, of course, are coming steadily under better control as time goes on, and a striking exception which occurred in the case of the first, in the Himalayan valley of Kulu, in the year under report, only emphasises that fact. In more accessible regions, where a sanitary organisation existed and cholera vaccine was readily available, the incipient epidemic was speedily checked, but in the remote valley of Kulu it was some time before the requisite measures could be put in force, and meanwhile the disease had made alarming progress. The means eventually adopted were disinfection of water-supplies, diversion of water-courses, restriction of movements of population, closure of courts, medical inspection of traffic, mass inoculation and temporary suspension of the fruit trade, together with treatment of the sick by the essential oils mixture, kaolin, and potassium permanganate pills. There were 1746 seizures and 1164 deaths reported, but the control of traffic across the Sutlej river prevented the spread of the disease into the Simla Hill States. It is clear the epidemic would never have made such headway if more adequate means for combating it at an early stage had existed, and the report emphasises the necessity of forming a number of fully staffed and equipped mobile units to deal with such isolated outbreaks.

Jail Diets.

For many years past the kind of distinction which exists in the diet scales of prisons between European and Indian prisoners has been a grievance with Indian reformers, and of late, when so many Indians of a superior social status have been confined for political offences, the question has been increasingly agitated. Prominent Indian politicians have brought the matter forward repeatedly, and have not hesitated to contend that the differentiation of treatment is based on grounds of race, creed, and colour. A recent issue of the *Pioneer* sums up the results of inquiries that have been proceeding into this and other matters in which racial discrimination in jails is alleged to occur in the United Provinces and Punjab, and comes to the conclusion that racial prejudice cannot fairly be alleged as a cause of the divergencies of treatment which undoubtedly exist. Indians of the poorer classes are admittedly much better off, in the matter of diet and in many other respects, in prison than when pursuing their ordinary avocations without the prison walls. But where the higher grades of Indian society are concerned the reverse is the case, and the special diets and other amenities provided for European prisoners certainly place them relatively in a better position than the higher grade Indian, who, often accustomed to western luxuries as he is, finds himself badly off on a ration which would more than satisfy a manual labourer of his own race. Whether his offence was of a political character or not should not affect the issue; this is just one of those questions in which a little common sense and good feeling on both sides would lead to an amicable settlement, and a revision of prison diets in favour of the Indian upper classes might be justified on grounds of health alone. There can be no question of a contraction of the European scales, which it does not seem to have been suggested are excessive.

UNITED STATES OF AMERICA.

(FROM AN OCCASIONAL CORRESPONDENT.)

Mental Hygiene.

A PRELIMINARY announcement of the first International Congress on Mental Hygiene has just been made. The congress is under the patronage of President Hoover and will be held in Washington, in connexion with the annual meetings of the American Psychiatric Association and the American Association of the Study of the Feebleminded, from May 5th–10th, inclusive. It is hoped to compare international experience in mental hygiene work and to promote international coöperation in the movement. Another object of the conference will be to correlate the activities of such various workers as the psychiatrist, the psychologist, the psychiatric social worker, occupational therapist, public administrator, educator, and sociologist. Mental hygiene objectives will be considered both in the body of the congress and by special committees appointed to sit between sessions. Great Britain is represented on the advisory programme committee by Dr. Bernard Hart. It is planned to reduce formal papers to a minimum in order to have plenty of time for discussion. Reduced steamship rates are available on the boats of all companies that belong to the Trans-Atlantic Passenger Conference. Further particulars are available from Mr. John R. Shillady, at 370, Seventh Avenue, New York City.

More than six hundred leaders of the mental hygiene movement gathered recently in New York to celebrate the twentieth anniversary of the movement in this country. Dr. W. H. Welch recorded the gathering of 14 persons on May 6th, 1908, at the home of Anson Phelps Stokes, in New Haven, to found the Connecticut Society of Mental Hygiene, and contrasted that gathering with the great scope and importance of the movement to-day. Dr. Angell spoke of the mental hygiene work which has been done under the direction of Dr. Arthur H. Ruggles in Yale University. Among the numerous messages of congratulation received was one from Sir Maurice Craig, the Chairman of the National Council for Mental Hygiene of Great Britain.

IRELAND.

(FROM OUR OWN CORRESPONDENT.)

Public Health Propaganda in County Kildare.

Dr. J. A. Harbison, medical officer of health for the county Kildare, is performing a useful public service in contributing to the local press occasional articles dealing with public health topics. In a recent article he deals with the medical inspection of school-children. He quotes from Sir George Newman as to the objects of such inspection. Its purpose is not merely to detect defects or signs of disease and to treat the affected children, but to prepare the child for education and citizenship. The service is preventive in purpose and aims at establishing health as a positive quality, and not as a mere absence of disease. It must seek the causes of ill-health, and, as far as possible, prevent them. It must trace habits of personal hygiene. Dr. Harbison shows that the school medical service cannot succeed in these aims unless it has the cordial coöperation of teachers and parents. Parents should, therefore, be encouraged to be present at the examination of their children, and

see that the advice then given is carried out. Malnutrition is more often the result of improper diet than of insufficient food. He goes on to enumerate some of the serious defects that may be present unnoticed in a child unless he is subjected to personal inspection. Among these are defective teeth, diseased tonsils, chronic adenitis, and even active tuberculosis. Dr. Harbison's clearly written articles should help to make his work in county Kildare successful.

Death of Dr. Thomas Dowse.

One of the most highly respected practitioners in the south-east of Ireland, Dr. Thomas J. Dowse, of Wexford, has recently died. He obtained his medical degrees from Dublin University in 1881, and spent his professional life in Wexford, where he was physician to the County Hospital. He was a man of high professional skill, punctilious in his attentions to his patients, and generous and courteous in his treatment of the poor. He was held in universal esteem in Wexford by all classes of the community, as well as by his professional brethren. He came of a family which has given many members to medicine, while others have reached high offices in the Church.

SCOTLAND.

(FROM OUR OWN CORRESPONDENT.)

The Universities in Public Administration.

IN a recent address to the Institute of Public Administration, Dr. T. J. Mackie, professor of bacteriology in the University of Edinburgh, pleaded for a more extended use of Universities and University staffs in the health and research work of the public authorities. Problems, he said, were continually confronting our governing authorities, central and local, in which expert assistance was required beyond the scope of their own permanent officials. The names of University professors were often to be seen among the members of Royal Commissions and Government Committees, and investigations of public importance were sometimes referred to University experts; but he wondered whether the full possibilities of the Universities in this respect were perfectly appreciated, and whether the knowledge of University workers was utilised sufficiently in the common good. In the Universities the central and local governments could find a wide choice of advisors, consultants, and investigators for the very various problems which every day beset them.

Prof. Mackie also discussed an urgent question of the moment—namely, the relation of the new hospital organisation to the University medical schools—and suggested that it might be to the advantage of certain local authorities to enlist medical school coöperation in the medical management of their new municipal hospitals. In recent years, the medical schools had recognised that remedial measures and prophylaxis through research must go hand in hand. Some of them had attempted to institute full-time professorships in the main clinical subjects, so that the occupant of the chair might devote himself entirely to hospital work, teaching, and research. Was it not possible that in University centres the hospitals of the future might be most effectively staffed—in the interests of the public, of medical education, and of research—by a whole-time medical school personnel, and so become still greater centres of progressive medicine—in short, University hospitals?

Prof. Mackie's paper will, no doubt, be published in full. He strikes the same note as many of the younger men in the medical profession who look forward to a closer integration of teaching, research, and administration, as against the policy hitherto favoured by the voluntary bodies of strict independence and reservation of offices for the men in so-called "consulting" practice. Views are far from unanimous, and much is to be said from each side; but we have reached the moment for a radical discussion of the possibilities of "coöperation," if only to meet the rising demand for more treatment and more investigation of disease on the extended scale open only to well-equipped institutions.

INFECTIOUS DISEASE IN ENGLAND AND WALES DURING THE WEEK ENDED JAN. 18TH, 1930.

Notifications.—The following cases of infectious disease were notified during the week:—Small-pox, 414 (last week 335); scarlet fever, 2968; diphtheria, 1819; enteric fever, 44; pneumonia, 1204; puerperal fever, 72; puerperal pyrexia, 119; cerebro-spinal fever, 8; acute poliomyelitis, 5; encephalitis lethargica, 19; continued fever, 1; dysentery, 7; ophthalmia neonatorum, 96. No case of cholera, plague, or typhus fever was notified during the week.

Fresh small-pox cases, while fewer in London than in the previous week, were more numerous in some other counties and were more widely distributed. Derby reported 1 (R.D. Chesterfield); Essex, 54 (East Ham, 1; West Ham, 36; Walthamstow, 11); Hertford, 1 (East Barnet Valley); Leicester, 58 (42 in the County Borough); Middlesex, 4 (Tottenham, 3; Wood Green, 1); Northampton, 1 (Rothwell); Peterborough, 1 (Borough); Sussex East, 6 (Eastbourne); Warwick, 3 (Coventry, 1; Nuneaton, 2), Yorkshire West Riding, 70 (Dewsbury, 3; Halifax, 4; Huddersfield, 13; Leeds, 3); and in urban districts, Batley, 9; Birstal, 5; Rothwell, 20; Spenborough, 9.

The number of cases in the Infectious Hospitals of the Metropolitan Asylums Board on Jan. 21st–22nd was as follows:—Small-pox, 528 under treatment, 18 under observation (last week 503 and 33 respectively); scarlet fever, 2482; diphtheria, 2682; enteric fever, 23; measles, 917; whooping-cough, 124; puerperal fever, 30 (plus 16 babies); encephalitis lethargica, 119; poliomyelitis, 2; "other diseases," 16. At St. Margaret's Hospital there were 15 babies (plus 5 mothers) with ophthalmia neonatorum.

Deaths.—In the aggregate of great towns including London there was 1 death from small-pox, 3 (1) from enteric fever, 60 (22) from measles, 10 (3) from scarlet fever, 18 (1) from whooping-cough, 62 (12) from diphtheria, 59 (17) from diarrhœa and enteritis under two years, and 67 (15) from influenza. The figures in parentheses are those for London itself.

Small-pox was mentioned as a cause of death in a case assigned to the Metropolitan Borough of Shoreditch. (The returns for December, just received, include a fatal case provisionally classed to small-pox at Rawmarsh U.D. Yorks W.R.) The two cases of enteric fever outside London were both reported from Manchester. Six fatal cases of measles were reported from Wigan, 5 from West Ham, and 3 from Manchester. Leeds reported 3 fatal cases of scarlet fever, Newcastle-on-Tyne 3 of whooping-cough. Fatal cases of diphtheria were widely distributed: Ipswich and Liverpool each 4, Southampton, Bristol, Birmingham, and Hull each 3. Liverpool had 7 deaths to report from diarrhœa, Manchester and Newcastle each 4. The highest figures for influenzal deaths are reported from Birmingham and Manchester each 6.

The number of stillbirths notified during the week was 311 (corresponding to a rate of 47 per 1000 births), including 55 in London.

Fatal Case of Small-pox.—The death mentioned above was that of a boy 10 years of age, unvaccinated, who became ill with headache and sickness on Dec. 29th. Spots first appeared on Jan. 4th or 5th. Dr. Maitland Radford, medical officer of health for Shoreditch, tells us he was asked to see the boy on Jan. 7th, when he found a typical small-pox (mild type) eruption, the boy seeming much more ill than is usual with this type of case. The boy died on Jan. 12th in the Joyce Green Hospital, the cause of death on the certificate being stated: (*a*) encephalomyelitis, (*b*) small-pox.

BOLINGBROKE HOSPITAL.—This institution, at Wandsworth Common, last year treated 2252 in-patients and 13,022 new out-patients. The average residence of the in-patients was 15·8 days.

Correspondence.

"Audi alteram partem."

EARLY DISCHARGE OF SCARLET FEVER CONVALESCENTS.

To the Editor of THE LANCET.

SIR,—In your interesting survey of the Reports of Medical Officers of Health for 1928 you observe, under the heading of Infectious Diseases, that "the use of antitoxin for *scarlet fever* is reported upon favourably, and several isolation hospitals claim to be discharging scarlet fever cases after 28 days without harmful results." The suggestion is that the use of the serum has enabled the discharge of patients at the end of so short a period. May I be permitted to point out that 29 years ago at the Eastern Hospital, Homerton, I began the practice of discharging all mild and uncomplicated cases of scarlet fever at the end of four weeks (see Annual Report of the Metropolitan Asylums Board for the year 1903, page 208 and page 177)? And I continued it till I retired in 1926.

Nor was I alone in this practice. The late Dr. J. B. Curgenven had forestalled me in 1890, and he was followed by the late Dr. Robert Milne. They both attributed the safety of the discharge of scarlet fever patients on an earlier day than was customary to the use, chiefly, of eucalyptus oil. They were both right in their practice but wrong in their explanation of its safety. Most of us were in those days under the influence of the fetish of the supposed infectiousness of the peeling cuticle, and were too timid to move against custom. I should not be surprised to hear that it was safe to discharge some scarlet fever patients before the end of the fourth week, quite apart from the use of serum. But the use of serum, by hastening recovery and preventing complications, should lead to the early discharge of a larger number of scarlet fever patients than heretofore.

I am, Sir, yours faithfully,

E. W. GOODALL.

Hemingford Abbots, Hunts, Jan. 26th, 1930.

CHEST COMPLICATIONS AFTER OPERATION.

To the Editor of THE LANCET.

SIR,—In Dr. C. J. Fuller's paper and a leading article in your issue of Jan. 18th the incidence of post-operative chest complications was discussed. Diaphragmatic inertia was shown to be one of the causative factors and, in order to counteract this, respiratory exercises were prescribed, but the practical results from these fell far short of anticipation. As regards these exercises, full expansion either of both lungs simultaneously or of single lungs alternatively was attempted; diaphragmatic movement at the culmination of a thoracic breath was aimed at. The fact that there is an alternative method which is an extremely simple one to teach has led me to presume on your valuable space.

Sir Arthur Keith (1909) showed that the upper lobes are chiefly expanded by the upper ribs. He analysed the diaphragm into the crura and the sterno-costal portion, the former acting chiefly through the roots and on the apices of the lungs. Sir Charlton Briscoe (1920–27) expanded this conception and utilised contraction of the dome of the diaphragm to aerate the lower lobes of the lungs. As regards the interplay of the alternative respiratory muscles he considered that, according to Blix's law, "stretch" was the determinant. Lady Briscoe (1928) in some beautiful laboratory experiments demonstrated selective activity of the dome and crura of cats by alteration of position of the spinal column, the criterion being that extension of the spine readjusted the relative "stretches" of the crura and dome in favour of the former.

Prof. Wood Jones (1913) showed that anchorage of the alternative respiratory muscles in accordance with posture determined the breathing mechanism that predominated in various animals. Utilising the above information I have been using selective breathing movements, when re-educating the abdominal wall, and more recently, when dealing with bed-patients convalescing from abdominal operations. From the point of view of treatment the abdominal wall and diaphragm are a convenient pair (prime-mover and antagonist); selective breathing movements fulfill the desiderata: "little and often," relaxation of the antagonist, selection of the "true function" (Mackenzie) and a suitable task for a damaged muscle, all of which are laid down by Dr. J. B. Mennell in connexion with muscle re-education. The forcible exercises given to Dr. Fuller's patients contravened the principle that "no enfeebled muscle should ever be stretched" (Mennell).

When re-educating the diaphragm, an initial expiratory movement should be made by a slow coördinated contraction of the abdominal wall; this anchors the periphery of the dome of the diaphragm and gives the muscle adequate "stretch." Coördination of the abdominal wall and avoidance of thoracic movement come easily, if the patient lays his hands on the chest and on the abdomen, both on the binder and free areas. These movements, if sufficiently controlled, will be found painless and are popular with patients, as they often help flatulence.

I am, Sir, yours faithfully,

J. K. MCCONNEL.

Clifton Hill, St. John's Wood, Jan. 23rd, 1930.

MUSCULAR MOVEMENTS OF THE COLON.

To the Editor of THE LANCET.

SIR,—In his informative article on radiography of the colon (THE LANCET, Dec. 28th, 1929, p. 1377), Dr. Barclay tells us that movements corresponding to ordinary peristalsis are not seen on the fluoroscopic screen, but only mass movements occurring a few times per day. It is difficult to reconcile this interesting statement with clinical experience, authoritatively rendered as it is by an experienced radiographer. For example, frequent colonic movements are experienced by everyone in slight intestinal disturbances, following the taking of a laxative, in the dispersion of bowel flatulence, and so forth. Are we to understand that these movements are all of the mass movement type? Clinically they appear to be ordinary peristalsis. One thinks, too, of visible peristalsis in chronic intestinal obstruction. Perhaps Dr. Barclay would be good enough to explain the point.

I am, Sir, yours faithfully,

L. J. GREEN.

High-road, S. Tottenham, N., Jan. 19th, 1930.

COMPULSORY TREATMENT OF VENEREAL DISEASE.

To the Editor of THE LANCET.

SIR,—Any opinion advanced by Dr. Sequeira deserves careful consideration, and his letter in your issue of Jan. 18th is very much to the point. Two years ago I contributed [1] to a correspondence in THE LANCET that took place regarding the venereal campaign and referred to the Edinburgh Bill, when I expressed the opinion that while a great teaching centre and medical school like Edinburgh, to which preventive medicine owes so much, might safely be permitted to carry out a local experiment in prevention by compulsory treatment, I personally, in view of the wide divergence of medical opinion as to what constitutes effective treatment, did not consider

[1] THE LANCET, 1928, i., 883.

legislation enforcing treatment practical or desirable *except for a short minimal period of three months*, which should be sufficient in the great majority of, but of course not in all, cases to render the patient non-contagious.

Such a minimal course of compulsory treatment for syphilis or gonorrhœa would not, I gather, offend Dr. Sequeira and those who think with him, and might be accepted as a compromise by the advocates of compulsory treatment. Three months compulsory treatment for syphilis and three months compulsory treatment or attendance for observation for gonorrhœa (for most cases of the latter are cured in less than three months) would do much good and little, if any, harm.

I am, Sir, yours faithfully,

H. WANSEY BAYLY.

Harley-street, W., Jan. 22nd, 1930.

MENTAL TREATMENT BILL.

To the Editor of THE LANCET.

SIR,—In your leading article (Dec. 7th, 1929), commenting on Clause 2 (1) of Lord Russell's Bill, you say:—

> If a person with mental disturbance voluntarily asks for treatment in a hospital or home, why should he, more than any other invalid, have to be notified to the Board of Control? . . . It is obvious that those in charge of such patients, let alone the patients themselves and their relatives, will object to compulsory notification. . . . We trust that obligation to notify all voluntary mental patients will be withdrawn, and discretion left to the medical man responsible for the treatment of the patient."

It is evidently for the good of the community that cases of slight instability which cannot be proved to be dangerous or unfit to be at large should be treated on a voluntary footing in places without detention, and that everything should be done to make it easy for them to come to a hospital at an early stage, and *of their own accord;* whereas if they think that they are placing themselves under Lunacy control they are likely to hesitate, and thus the chance of a speedy recovery may be delayed. It is natural also that not a few members of the medical profession are averse to having their uncertified patients compulsorily notified to the Board of Control.

As regards transient cases of high temperature with delirium (e.g., puerperal, pneumonic, influenzal) it is very undesirable to treat such cases in asylums because there is there no qualified nursing staff competent to take charge of patients in such peril of their lives. Delirium subsides in the course of a few weeks, when the patient becomes again normal. The natural way to keep such cases safe from stigma is to treat them as *hospital cases* in homes or hospitals appropriately staffed, and apart from lunacy administration.

If public asylums wish to open their doors to voluntary boarders a short Bill could be brought in for the purpose (as in the case of Maudsley and Dartford). In places where patients know they are *not detained*, the risk of ill-treatment is minimised—as also is the necessity for inspection. It is hoped that the Bill may be amended in respect of Clauses 1–5.

I am, Sir, yours faithfully,

S. E. WHITE, M.B.

Strone-road, Manor Park, E., Jan. 28th, 1930.

MEDICAL FOUNDATIONS.

To the Editor of THE LANCET.

SIR,—I agree with all that Dr. Henry Robinson says. In a letter (entitled Thoughtful Gratitude), from myself, which you inserted last year, I pointed out that when medical men or their families are attended or prescribed for by a colleague, it would be a kindly and useful act if they sent to one of the medical foundations a cheque for a small amount when one remembers how many medical men find it difficult in these days to save, and how often the widows of medical men are crushed down with poverty and the struggle to provide for their children, it is time that others more fortunate should stretch out a helping hand. The foundations are doing a great work, but they are anxious to do far more. Unfortunately their hands are tied by want of money, and many of us who could help—at least to a small extent—from want of thought or want of feeling, pass by, like the Levite, on the other side, and leave many unfortunate ones to battle on with their cares and their poverty.

I am, Sir, yours faithfully,

Harrogate, Jan. 20th, 1930. JAMES G. MACASKIE.

NEPHROSIS AND NEPHRITIS.

To the Editor of THE LANCET.

SIR,—In the leading article with which you have honoured my report to the Medical Research Council on A Classification of Bright's Disease you say that the student is left in some perplexity as to why the term nephritis mitis is preferred to nephrosis for one kind of nephritis. Readers will find on pages 119 to 123 reasons for objecting to this particular application by Volhard and Fahr and by Munk of Müller's term nephrosis.—I am, Sir, yours faithfully,

DOROTHY S. RUSSELL.

Bernhard Baron Institute of Pathology, London Hospital, E., Jan. 24th, 1930.

LAENNEC AND THE BRUIT D'AIRAIN.

To the Editor of THE LANCET.

SIR,—Despite "Bobo," it would seem that "Anglo-Gallicus" is really right. The name of the Breton physician should be spelt *Laennec*, as he wrote it and as he printed it on his book-plate. It is thus spelt on his monument, and, for us, in Gee's classic work. The wrong fashion, with a diæresis over the first "e," became official, as "Bobo" hints, about eighty years ago. But the French Academy in these later years has formally recanted, and all future editions of the invaluable and pleomorphic "Larousse" will conform to what is now correct, officially and unofficially. With a reversion to correct spelling, there will doubtless come about a general reversion to the pronunciation that so many accomplished Frenchmen have always preferred to the "trisyllabic" one.

Again, both "Anglo-Gallicus" and "Gallo-Britannicus" seem to be right in insisting that, to-day, *airain* be always translated as meaning either (1) bronze, or (2) an object, such as a bell, made of bronze, unless a frankly metaphorical usage is implied. The archaic, or at any rate, Elizabethan and Jacobean use of *brass*, indiscriminately, for all copper alloys, is interesting historically, but irrelevant save as an excuse for confusion.

Gee was clearly right in saying that the *bruit d'airain* does not require a coin for its production, and in translating the expression by its exact English equivalent—"bell-sound." When Trousseau spoke of the *bruit d'airain* he surely had in mind the sound so familiar to everyone who has lived in a French village and has listened, at night from his bed, or by day from the hills, to the single "strike" of the bell in the steeple.

Dr. McLaughlin and Dr. Dix-Perkin have explained to us why it was only, *par moment*, that Laennec, when practising auscultatory percussion over a pneumothorax, heard the *tintement* that so exactly recalls this characteristic "sound of the bell." For this we should be very grateful to them.

I am, Sir, yours faithfully,

F. G. CROOKSHANK.

Wimpole-street, W., Jan. 25th, 1930.

SPINAL ANÆSTHESIA.

To the Editor of THE LANCET.

SIR,—Sir Francis Shipway pointed out in his letter last week that to sit a patient up for fear a heavy solution used to produce spinal anæsthesia should "go to the brain," is an entirely obsolete and erroneous technique. Erroneous it may be but it is not quite obsolete. I saw it practised myself in one of the capitals of Europe no longer ago than last May. It was not, however, its antiquity or its error to which I particularly wished to draw attention, but the fact that it had given origin to a certain fear, the fear of a fall of blood pressure. It seemed to me that to trace the origin of this fear would be the best way to dispel it.

Turning to the letter of Dr. Howard Jones, I do not think he distinguishes with sufficient nicety between the Pitkin method and the arguments supporting that method. He says he rejected it on theoretical grounds. I would rather put it that the theoretical grounds should be rejected but the method given a prolonged trial. Pitkin's claims are exaggerated and some of his statements are demonstrably incorrect, and the excellence of the method is obscured and brought into disrepute by such extravagance. Surely a method which may reasonably be expected to give complete muscular relaxation for one and a half hours, with a degree of safety, all things considered, at least equalling that of general anæsthesia must have a very large sphere of usefulness. Novocain is the safest spinal anæsthetic we know, the gliadin tends to keep the solution together and delays absorption, thereby diminishing toxicity and prolonging the effect, both very important points, and the alcohol makes the solution lighter. Though this quality of lightness may be of no physical importance, in the present state of opinion it has very definite psychological value.

Dr. Jones says, "Most people will agree that spinal analgesia results either from a simple nerve block across the cauda equina or in the dorsal region from root block." Certainly, but neither of these processes seems to be adequate to explain the phenomena observed in the case I described. This patient felt no pain at a time (20 minutes) during which muscular rigidity was increasing after having been completely in abeyance for 40 minutes. I therefore concluded that the path of pain to the brain was blocked. Where? Is it possible that:—1. The rigidity was due to the unblocking of the efferent half of the reflex arc alone? If so, what stimulated the muscles to action? 2. Impulses passing from the seat of operation up the afferent half were responsible for the stimulus to the muscles but conveyed no pain stimulus. Both these conceptions seemed so difficult that I ventured to suggest that the anæsthetic, some of which we knew to be in the higher dorsal region, was there blocking the spinothalamic tract. It still seems to me the most likely explanation.

One more point. Dr. Jones credits me with a theory that I am unable to identify; it seems to involve the carrying on of breathing by means of the respiratory centre in the presence of paralysed phrenics. We inject novocain into the spinal theca, the abdominal muscles are completely paralysed. If the novocain goes above the third and fourth cervical, why is not the diaphragm paralysed? I suggested that novocain paralyses receptor mechanism only; that the abdominal muscles are not really paralysed but only flaccid from the complete absence of stimuli. The phrenic centre has a constant stream of afferent impulses coming to it from the respiratory centre, hence the activity of the diaphragm. There is nothing quite analogous in the case of the abdominal muscles.

I am, Sir, yours faithfully,

Manchester, Jan. 27th, 1930. E. FALKNER HILL.

MEDICINES IN THE MASS.

To the Editor of THE LANCET.

SIR,—We who practice in industrial areas are perhaps better qualified than any to speak of the large consumption of patent medicines in this country to which you alluded in a leading article last week. One sees the shelves and window sills crammed with patent medicine bottles during one's daily rounds. Patients refer to various nostrums which they may happen to be taking irrespective of what particular medicine they may be getting from oneself as their family doctor.

The high incidence of gall-stones in this neighbourhood makes the vendor of a gall-stone "remedy" a popular figure. Any herbalist down a back street in Bradford or Leeds is apparently far more skilled to "disperse" gall-stones than "the doctor," whose training apparently quite neglected this painful but common malady. One such quack sells a remedy consisting of a bottle of oil and some powders. By taking these, all gall-stones in the patient's body speedily deliquesce and flow easily into the alimentary tract and are voided in the fæces. The patient triumphantly extracts the alleged stones from the fæces and brings them up forthwith to the surgery. One of my patients who had been suffering from renal colic and in whom a stone was afterwards shown by X rays to be lying at the lower end of the ureter, for some mysterious reason—or because I had once suggested gall-stone colic—went and spent 23*s.* for the oil and two powders, and with great glee, a day or two later, brought a number of fæcal-looking lumps in a piece of paper to the surgery. "My gall-stones," he exclaimed, breathless with excitement. Examination showed that they were formed simply by the combination of the oil and powders in the alimentary tract. Only this morning I was told of a woman suffering from no symptoms suggestive of gall-stones, who had taken the above "remedy," and had passed 350 gall-stones!

Is it not time that something was done by Parliament to put down this iniquitous traffic? So long as such a combination of ignorance and credulity exists amongst the masses of this country, so long will the quack flourish. Here in the West Riding where the depression of trade is so acute—patients are apt to remind us of it shortly before the account goes in—it is nothing less than criminal that a working man can be so easily induced to part with 23*s.* for a fictitious cure of a disease which he does not possess.

I am, Sir, yours faithfully,

Jan. 27th, 1930. M.R.C.S., L.R.C.P.

The Services.

ROYAL NAVAL MEDICAL SERVICE.

Surg. Capts. (Retd.) to be Surg. Rear Admirals (Retd.): H. J. Chater and R. W. G. Stewart.

The following appointments are notified:—Surg. Comdr. L. R. Warburton to *Victory*, for R.N. Barracks, Portsmouth; Surg. Lt. W. D. M. Sim to *Vindictive*.

ROYAL ARMY MEDICAL CORPS.

Lt.-Col. J. G. Bell, having attained the age for compulsory retirement, is placed on retd. pay.

Capt. W. O. Holst to be Maj.

E. F. Hunt is granted a temp. commn. in the rank of Lt.

ROYAL ARMY DENTAL CORPS.

Capt. A. A. McMullan to be Maj.

TERRITORIAL ARMY.

Capt. R. B. Rutherford to be Maj.

ROYAL AIR FORCE.

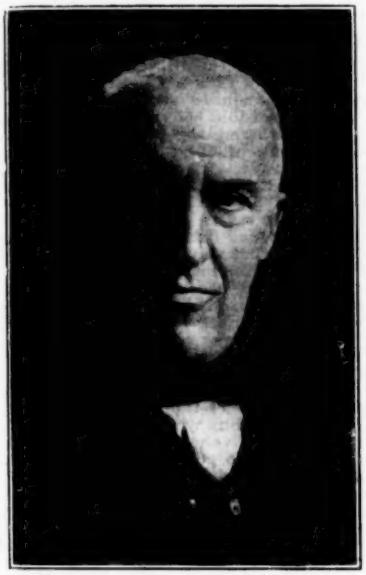
Flight Lt. F. T. Boucher resigns his commission on appointment to a commission in the Royal Army Medical Corps.

Obituary.

PHILIP BOOBBYER, M.D., M.S. DURH.

WE noted last week the death of Dr. Boobbyer within a few days of his retirement from the medical officership of Nottingham, a post which he had filled for forty years. His death occurred suddenly on Jan. 21st, in his seventy-third year.

Philip Boobbyer was the son of Joseph Hurst Boobbyer and came of Huguenot stock, a fact which may have some relation to the almost religious fervour with which he put through large schemes of social welfare. He was educated at Brighton College with a view to becoming an engineer, but after two years of machine-drawing he discovered his bent was for medicine and went to King's College, London, qualifying in 1881 and taking the higher degrees of the University of Durham some years later. After qualifying he was resident at King's College Hospital and demonstrated anatomy at Newcastle before succeeding Dr. B. A. Whitelegge as medical officer of health for the borough of Nottingham. He was then only 31 years of age and had already for some years been health officer to the Basford Rural Sanitary Authority. The development of health services at Nottingham is practically the record of Boobbyer's forty years term of office. One of its chief landmarks is the abolition of the pail-closet system in the city and the coincident disappearance of typhoid; had Boobbyer had his way the change would have been complete long before, but even a convinced medical officer has to convert his lay colleagues, and the conversion cost the city over half a million. Open-air methods were his great hobby, whether it was a question of letting air into the infant school, the sanatorium, or public places of entertainment. The cottage hospital and school for tuberculous children at Thurgarton was one practical outcome of his enthusiasm, but it was not propaganda or stunts that filled up the bulk of his time for he was fully occupied with the routine work of a sanitary department, the personnel of which increased during his tenure from 30 or 40 to 220. He was also examiner in public health for the universities of Birmingham and Sheffield and the Royal Sanitary Institute. Apart from his annual reports his contributions to medical literature were slight; they included a special report to the Home Office on the health of lace dressers, and articles on the open-air treatment of small-pox and other acute specific diseases. But to understand the principles which infused his work it is only necessary to read the report presented last year to the Nottingham public health authority, in which he sketched the development of local public health measures during the preceding thirteen years.



DR. BOOBBYER.

[Photograph by Lafayette.

A colleague in the public health services writes: "I met Boobbyer at the Plymouth Congress in the summer of 1928, when he discussed with his usual keenness the appointment of his successor and seemed to have in prospect a happy period of well-earned retirement. A virile personality, he had strong convictions and was not afraid to express them, when charm of manner and transparent honesty balanced his outspokenness. Long ago a new member of the health committee who questioned his veracity received the unexpected retort, 'If you don't withdraw that statement, I'll come round and pull your nose.' After receiving counsel in an undertone from his neighbour that the medical officer would probably be as good as his word, the member withdrew. In his younger days Boobbyer was no mean athlete. It is related how he and two colleagues, bored with the opening ceremonial of a public health congress in Edinburgh, paid a visit to the Castle where they came upon a sergeant instructing some kilted recruits in putting the weight. Presently the instructor addressed the silk-hatted befrocked trio, 'Perhaps one of you young gentlemen would like to have a try!' Boobbyer accepted the invitation, doffed his coat and hat and threw the weight a good ten feet further than the soldiers. The cold bath before breakfast at the age of 73 (on which his death followed) was typical of a man who preferred to live dangerously. He would not have liked to rust out."

Dr. Boobbyer married a sister of the architect Mr. Watson Fothergill by whom he had two sons and two daughters, all of whom survive him.

ALBERT MORTON MARTIN, M.B., B.S. DURH.,

CONSULTING SURGEON, ROYAL VICTORIA INFIRMARY, NEWCASTLE-UPON-TYNE.

THE death of Mr. Martin on the last day of the old year came as a shock to his numerous friends in Newcastle and district. Though he had not been well for the past two months it was thought that his health was improving and he was at work the day before he died. He had only retired from the active staff of the Infirmary in September last on attaining the age limit of 60 years, and had been looking forward to spending his retirement in the country of which he was so fond.

Albert Martin was born and bred a Northumbrian, and graduated M.B., B.S. Durh. with honours in 1890. After acting as house surgeon to the Ingham Infirmary at South Shields he returned to the Newcastle Infirmary as house surgeon, and soon after was appointed honorary assistant surgeon. His promotion was rapid, so that for 29 years he was full surgeon in charge of wards and the greater part of that time senior surgeon. For a period he was also surgeon in charge of the then existing orthopædic department of the hospital. In private he had an extensive consulting practice, and owing to his special knowledge of diseases of bones and joints his services were in great demand in cases of dispute arising out of the Workmen's Compensation Act.

Mr. J. Hamilton Barclay writes: "Having been Mr. Martin's private assistant for over ten years and having worked with him for long at the Royal Victoria Infirmary, certain characteristics stand out prominently in my mind. First, his wonderful surgical skill. He had, more than almost any one I know, the gift or faculty of making operations look easy and simple. While operations on the bones and joints were his favourite, yet he was perfectly at home in all operations of general surgery, and particularly in the region of the gall-bladder and the pelvic organs. To see him remove a torn semilunar cartilage through a small transverse incision was a revelation. His touch was wonderful; to a casual observer he might at times appear rather rough in his handling, yet I have never known him bruise or lacerate the tissues in his manipulations. Without appearing to hurry

he got through a morning list in a remarkably short time and without any fuss. He did not bother with many of the new and elaborate techniques but was satisfied with the technique that had served him so well in the past and the results showed that he was right, for his operation wounds healed perfectly. Secondly, his wise judgment and surgical sense. He was an excellent diagnostician and always seemed to know just when to operate. In my earlier days I was often astonished at his decision to 'sit' on a case overnight when to me it appeared to be urgent; but I soon found he was right. Last, but not least, his wonderfully bright and optimistic temperament. He was always buoyant and cheerful, even in the face of adversity, and he was always considerate and loyal to his juniors and colleagues. Whatever his assistant did in the wards was right. The Infirmary will be a poorer and a sadder place for his loss."

Mr. Martin's wife predeceased him; he is survived by two sons, one of whom has followed his father's profession, and two daughters.

Dr. WILLIAM EIDINOW, who died on Jan. 23rd, was 34 years of age, and qualified as M.R.C.S. Eng. in 1917 from the London Hospital, where he held the appointments of emergency officer and surgical clinical assistant. He served from 1917 to 1920 with the rank of Captain in the Royal Army Medical Corps, in France, Italy, and Montenegro, and was awarded the Italian Silver Medal for Valour. After demobilisation he took up a busy practice amongst the working classes of Islington.

Parliamentary Intelligence.

NOTES ON CURRENT TOPICS.

COLLECTING CHARITIES (REGULATION) BILL.

THE debate on the second reading of the Collecting Charities (Regulation) Bill was resumed in the House of Commons on Tuesday, Jan. 21st.

Mr. E. BROWN said that this was a measure to provide for the investigation and regulation of charities that appealed to the public for support. It fell into three main parts. Clause 1 gave power to the Charity Commissioners to inquire into the affairs of collecting charities. Clause 2 gave power to the Charity Commissioners to regulate collecting charities. Clause 3, which required to be turned inside out, might gravely injure certain operations of trade-unions. It provided that the Home Secretary might make regulations—unspecified and unstated—enabling him to do three things: (*a*) He might permit persons to make or cause to be made visits from house to house for the purpose of making appeals for support for any collecting charity. (*b*) Persons might be permitted to make, or cause to be made, in places of public entertainment or public refreshment collections for any collecting charity. (*c*) Any collecting charity might cause collecting boxes to be exhibited in any shop for the purpose of making appeals for support for the charity. What would be the position of organisations which might be formed for perfectly good causes if this Bill became law? The Home Secretary had received a deputation from the larger collecting charities, and he (Mr. Brown) understood that the right hon. gentleman had made an arrangement with them. But what would be the position of the smaller charities not represented on the deputation? Unless the House could get assurances about the form of Clause 3 it should, in his opinion, hesitate to give a second reading to the measure, because Clause 3 was so vague in its drafting that it constituted one of the worst samples of legislation by reference that the House had ever been asked to pass.

Sir KINGSLEY WOOD said that this was an important Bill affecting the great charitable institutions of the country, and it called for scrutiny from every member of the House. A number of charities which called themselves national charities had been in communication with the Home Secretary at various conferences and had made certain objections to the provisions of the Bill. The Home Secretary had made some suggestions by way of meeting their difficulties. But the House ought to protect not only the national charities, but also the many small charities operating in particular localities. It appeared that if any county or county borough council liked to make representations to the Charity Commissioners, not on specific grounds, but because they had some sort of objection or complaint as regarded a specific charity, the Commissioners, without—at any rate for the moment—any specific right of appeal to any court of law, could put into operation the very drastic powers contained in the Bill. They could order any bank which happened to have the money of the charity to withhold payment to the people who actually invested their funds there, and could order the particular charity to be wound up. That was a very drastic power to give. The Departmental Committee on this subject had found that out of 80,000 charities only about 100 could be said to be preying on the public. That hardly justified the drastic provisions of this Bill. The London County Council took the view that if there was any question about the administration of charities they should be required to satisfy a competent authority and become registered. The Bill would have to be examined very carefully indeed in Committee. He hoped that the Home Secretary would see that nothing was done to interfere with the beneficent work of the very large number of small and large institutions of a charitable nature up and down the country.

Effect of Clause 3 on Finances of Charities.

Mr. PHILIP OLIVER said that this Bill was considered, and especially the provisions of Clause 3, by the Northern Association of Hospital Secretaries last October. The Association was a very responsible body, and the meeting was the largest attended gathering that it had held. The secretaries and superintendents of 30 hospitals were present from towns like Manchester, Liverpool, Warrington, Bradford, Leeds, Sheffield, Hull, Chester, Stockport, and Oldham. The secretaries of all the great infirmaries and hospitals of these towns were very much perturbed indeed as to the effect of Clause 3 on their finances. A big hospital would almost certainly have what was called a workpeople's fund committee. Collections were made from door to door. There were other hospitals which had beds or cots supplied by particular districts. The person responsible was somebody who lived in the district. Under this Bill the regulation must provide that "no such visits or collections shall be so made or caused to be made . . . as aforesaid except by persons licensed for the purpose by such officer of the police as may be designed for the purpose." When the Bill was printed he (Mr. Oliver) went to see the secretary of one of the big Manchester hospitals, and asked him what the effect of that provision would be upon their voluntary collectors. He replied that they would refuse to go to the police at all. Why should voluntary collectors, giving up their spare time for this work, go to the police to be licensed? There was absolutely no justification for such a proposal. Another gentleman, who was secretary of a large body known as the Manchester and Salford Medical Charities Fund, had stated that the effect of this measure would be to cause sensitive-minded collectors to throw up the job. These considerations were very gravely perplexing the minds of those responsible for the big hospitals of the country. Why did not the Home Secretary, instead of producing this Bill with supervision, extend the existing legislation to charities which were not controlled by that legislation? The War Charities Act prohibited appeals by any charity unless it was registered, usually by the local authority. No charity was allowed to be registered unless it had a responsible committee of not less than three persons, unless it kept proper books of account, and unless those books were open to inspection. That was a perfectly rational system of control. Police supervision was very objectionable, and in any case would cast a heavy burden on the police themselves.

Amendments Promised in Committee.

Mr. A. SHORT (Under Secretary for the Home Office) said that in this Bill the Government were seeking to meet the demand put forward not only by the charitable organisations themselves, but supported by the recommendations of the Departmental Committee. The Home Secretary recognised that Clause 3 was by no means perfect. It rightly gave rise to anxiety and to questions founded on a desire to protect the interests of these great charitable organisations. His right hon. friend would be prepared in Committee to make drastic amendments to meet the views of the House as expressed in all quarters, and thereby secure, if possible, unanimity when the Bill passed through the Committee stage. It was proposed to amend the Bill so as to permit an appeal to be made to the High Court against an order of the Charity Commissioners for the regulation of a charity under Clause 2. They also proposed to permit an appeal to Quarter Sessions against a refusal to license on the ground of fraud or maladministration of the charity itself. The regulations would apply to all charities, but the war charities which were now governed by various Acts of Parliament would be exempted as provision would be made by amendment. The regulations would be based in principle on the recommendations of the Departmental Committee

and would be in the form of those made by the Home Office, under the Regulation of the Street Collections, Police, Factories (Miscellaneous Provisions) Act, 1916. All charities, national and local, would be subject to the regulations. So far as the refusal of licences was concerned, they did not desire to cripple new enterprises, and they hoped to prevent an arbitrary refusal of licences and to ensure that they were not refused on arbitrary grounds. To prevent any discrimination against new enterprises, licensing officers would be required to grant a licence unless the person in respect of whom the application was made was under 21 years of age, was of bad character, or otherwise not a fit and proper person to be a collector, or where the charity was not being carried on in good faith for charitable purposes, or was not being properly administered, or was not keeping proper accounts of receipts and expenditure. The Home Secretary was most anxious that the regulations should be drawn in a broad and generous spirit, and that nothing in them should be calculated to cripple charities, national or local, which were above suspicion and where there was no suggestion of fraud. The regulations would be drawn in such a way as not to interfere with the creation of new charities. They would seek the coöperation of the great charitable societies, and would welcome the advice and assistance of all charities, large or small, in safeguarding the interests of all concerned. The regulations would be published, and they could be amended from time to time in the light of experience in order to meet the ever-changing needs of the community.

The debate on the second reading was adjourned.

Suggested Redrafting of Clause 3.

On Tuesday, Jan. 28th, the debate on the second reading of the Collecting Charities (Regulation) Bill was resumed.

Mr. SHORT (Under Secretary for the Home Office), replying to Sir HERBERT SAMUEL, said that the Home Secretary was fully conscious of the anxiety in regard to Clause 3 of the Bill, and realised that the measure ought to receive the general assent of the House as well as that of the great national and local charitable organisations. While he (Mr. Short) was not authorised to say that the clause would be withdrawn altogether, if the House would agree to the second reading when the Bill reached Committee the Government would redraft Clause 3 in such a manner as to cover the points which had been raised during the debate. Special consideration would be given to the interests of small domestic collections. The regulations would be drafted in broad general terms with a desire to safeguard the interests involved, and they would be laid on the Table of the House. If, when the Bill reached Committee and the regulations had been tabled, they could not get the general assent of the House, the Home Secretary realised that it would be futile to proceed with the Bill.

Mr. WOMERSLEY said that he had received a letter from a member of the Board of the British Hospitals Association stating that he was by no means satisfied with the Bill. He would like to know if the Under Secretary could assure him that he had received anything in the nature of assent to the Bill from that particularly influential body? In Grimsby every summer a particularly successful effort was made on behalf of the local hospital by means of a street carnival. A large number of collectors took part and they raised a good deal of money. During the week-end he had seen the Secretary of the Working Men's Committee responsible for this effort, and he had assured him that during the whole of the time that the collections had taken place they had never lost one penny, although thousands of pounds had been raised. If each of those collectors had to go to the police station to be registered the task of the Committee would be made absolutely impossible.

Mr. SHORT said that he did not think that the British Hospitals Association was a charitable organisation, but that it existed for the purpose of collecting statistics and so forth. He explained, however, that the Charity Organisation Society called together a large number of organisations—some 121 societies were represented, including a large number of hospitals—and some 216 members were present. The meeting passed a resolution unanimously in favour of the Bill as it was introduced into the House. He hoped that that statement would to some extent remove Mr. Womersley's anxieties. He repeated his promise to amend Clause 3 in order to satisfy the points raised in the debate and secure the general assent of the House to the Bill. With regard to collections, if they were house-to-house collections, under Clause 3 each collector would have to have a licence, but each collector would not have individually to apply for the licence. The licence would be applied for by the society for whom they were collecting.

The Bill was read a second time.

INDIANISATION OF INDIAN MEDICAL SERVICE.

On Jan. 22nd, replying to Major GRAHAM POLE, Mr. WEDGWOOD BENN (Secretary of State for India) stated that the progress of the Indianisation of the Indian Medical Service since 1924, the year in which the Report of the Lee Commission was published, was as follows: 1924, 150; 1925, 151; 1926, 161; 1927, 163; 1928, 165; 1929, 167. There were 127 Indians on Jan. 1st, 1928, holding temporary commissions in the Indian Medical Service who were not included in these figures.

MEDICAL EXAMINATION OF YOUNG PERSONS EMPLOYED AT SEA.

Miss BONDFIELD (Minister of Labour), replying to Sir BASIL PETO, said that the Draft Convention relating to the compulsory medical examination of children and young persons employed at sea, adopted by the International Labour Conference at Genoa in July, 1920, had been ratified by 21 countries, including Great Britain, Canada, and India.

CHILDREN (EMPLOYMENT ABROAD) BILL.

The Children (Employment Abroad) Bill was read a second time.

HOUSE OF LORDS.

THURSDAY, JAN. 23RD.

HOSPITALS AND ROAD ACCIDENTS.

The Road Traffic Bill was considered on report.

Requirements in Respect of Insurance Policies.

On Clause 35 Lord LUKE moved after subsection (1) to insert as a new subsection:—

"Where any payment is made by an authorised insurer under a policy issued under this Part of this Act in respect of the death of or bodily injury to any person arising out of the use of a motor vehicle on a road and the person who has so died or been bodily injured has to the knowledge of the authorised insurer received treatment in a hospital in respect of the fatal or other bodily injury so arising, there shall also be paid by the authorised insurer to such hospital the expenses reasonably incurred by the hospital in affording such treatment to an amount not exceeding £25 for each person so treated."

He said that the people affected by this amendment were the great hospitals near trunk roads in which beds were filled with people injured in motor accidents to the exclusion of local patients for whom the hospitals were provided. In the great majority of cases no return of expenses had been made to the hospitals. This amendment was brought forward in Committee and met with such strong support from their lordships that it was only withdrawn on condition that it should be dealt with on report. In the interval they had been invited to visit the Ministry of Transport and they took with them an amendment which had been approved by the Voluntary Hospitals Committee of the King Edward's Hospital Fund. After consultations they thought that Earl Russell (in charge of the Bill) would be able to move the amendment, but they subsequently learned that he was unable to do so.

Viscount KNUTSFORD said that it would be a very great disappointment to the hospitals if the Government were not able to accept the amendment. Insurance companies had to fix their premiums to cover the cost of medical expenses, and it seemed unreasonable that because the expenses were incurred in a hospital that made no charge they should escape that part of the reasonable payment for the recovery of the patient. The hospitals did not want to make any legal charge against their patients, and they quite realised the legal difficulties, but they trusted Lord Russell to get over them.

A New Principle in Insurance.

Lord PONSONBY (Parliamentary Secretary to the Ministry of Transport,) said that the Government were sympathetic to the underlying principle of the amendment, and they only wished that it could be made practicable. They could not stretch this Bill, however, to comprehend too many subjects, and they could not make it a measure for paying back to the hospitals sums which they were being deprived of by the number of accidents brought to them. They felt that that was outside the scope of the Bill. It really involved an entirely new principle in insurance, and must necessarily increase the premiums. If, as stated by Lord Knutsford, the hospitals were reluctant to put forward any legal claim on a patient, how could the Government place the liability on the insurance companies in an Act of Parliament? To draft a clause to do that would be almost impossible, and to ask the Government to be responsible for this new principle was asking too much.

The Earl of ONSLOW appealed to their lordships to carry on with their intentions and see whether, even if the particular form of words were not approved, it would be possible on the third reading for something satisfactory to all sides to be introduced. Even if this were a new principle in insurance, was Parliament not always introducing new principles in legislation? This Bill was full of new principles.

The principle of this amendment was strongly recommended by the Voluntary Hospitals Commission in 1925. He would cite some interesting figures which showed the experience of the Royal Surrey County Hospital, of which he (Lord Onslow) was president. That hospital was situated near the Portsmouth road and was favourably—or perhaps he should say unfavourably—placed for the reception of road accident cases. The number in 1927 was 156; in 1928, 170; in 1929, 153. The average number of days in hospital of these road accident cases was 34; and there was a constant occupation during that time of 15 beds for these cases. As most of these were men, and they had only 70 beds for men, a very high proportion of the accommodation was taken up by this class of case. That being so, a very heavy expenditure was entailed on hospitals like theirs in this connexion. The hospitals made no complaint whatever of having to take these cases; it was their duty, but where compensation was paid it seemed not unfair that part of that compensation should go to the hospitals concerned.

Earl HOWE said he hoped that the last word had not been said by the Government on this subject. If the strain on the hospitals became too great, and some of them had to put up their shutters, what would be the attitude of the Government then? The number of motor-cars in this country was not going to decrease, and there was not a word in this Bill as it stood that would increase public safety on the roads. Accidents, he thought, would tend to increase rather than to decrease in proportion.

Lord DANESFORT said that unless the Government could assist the House in finding some practical solution of this urgent problem there would be deep and widespread disappointment and dissatisfaction throughout the country. The voluntary hospitals had done magnificent work for years. Their finances were greatly strained even before the advent of motor-cars; since the coming of motor-cars those finances had been more strained than ever. When under this Bill they were making provision for insuring third party risks they were really bound to do what they could to help the hospitals out of the great difficulties with which they were now faced.

Lord ARMSTRONG said that, coming from the north, he would like to bear out what had been said about the experience of hospitals in the south. He was chairman of the Royal Victoria Infirmary, Newcastle, which had 550 beds. They had to reserve a ward of 30 beds entirely for motor accidents, and the cost to the infirmary they estimated at £5000 a year. He had read reports of several other hospitals in his area, and unless something could be done he felt that there would be great disappointment among the voluntary hospitals of the country.

Lord STANLEY of ALDERLEY said that the amendment did not involve a very exceptional or very wide extension of the insurance policy already provided for in the Bill. At present a man was liable for any accident which he caused. He was liable for the cost of medical attendance. If an injured person was taken to a private doctor or a private hospital or, he believed, to a poor-law infirmary, there could be no doubt that the insurance company would allow all the expense to which the person causing the accident was put in consequence of the accident. The only case—and that he understood from Lord Atkin was a doubtful one—where the liability might not exist was in the case of a voluntary hospital. Surely it was a very small extension of the principle which was admitted in the case of every other medical service to extend it to cover what was at least a moral and quite possibly a legal obligation upon a person causing an accident. To suggest that the amendment should be resisted because it would mean increasing the premiums which motorists had to pay was making a very large mountain out of a very small mole-hill. The cost of covering this extra liability would, he thought, be very small indeed.

The Earl of DONOUGHMORE appealed most earnestly to the Government to accept the amendment now, even if they might have to alter the wording at a subsequent stage.

The Marquess of SALISBURY said that unless the Government would announce their willingness to reconsider this matter before the third reading of the Bill he would be obliged to vote for the amendment.

Earl RUSSELL said that the foundation of the case of those who had argued in favour of the amendment was not open to dispute. A perfectly serious and genuine effort had been made by the Government to draft a clause which would be free from fundamental objections, but frankly they had been unable to do so. This amendment meant that the insurance company was to have placed upon it a liability which was only a legal one in the sense that it was imposed by statute. It was no part of their original contractual liability to the insured person. That seemed to violate almost every principle of law. There was another aspect of the question which had struck him very strongly, and which he would ask those who were interested in hospitals to consider. Was it not rather difficult to go on talking about voluntary hospitals when they were compulsorily raising money by statutory obligation? It seemed that in their own interests hospitals were embarking on rather a slippery slope. They would be wise to be careful before they embarked on this point of view. If there was an increase in premiums which was directly due to this liability, and if it was in any way substantial, or if there was anything which caused a sense of grievance in the minds of motorists, it might very well be that voluntary subscriptions would fall off to a larger extent than these involuntary subscriptions would meet.

The amendment was agreed to without a division.

The consideration of Bill on report was adjourned.

HOUSE OF COMMONS.

WEDNESDAY, JAN. 22ND.

Slum Clearances.

Mr. WEST RUSSELL asked the Minister of Health what programmes of slum clearance in the respective Tyneside local authority areas had been adopted and how many people in each case it was estimated would be rehoused.—Mr. GREENWOOD replied: Apart from schemes already approved, in regard to which I have given some information in reply to another question by the hon. Member, one scheme is now before me. It was submitted by the town council of Newcastle-upon-Tyne, and involves the rehousing of 945 persons.

Mr. WEST RUSSELL asked the Minister of Health how many buildings had been acquired for demolition, how many buildings had been demolished, and new buildings erected in connexion with slum clearance schemes since April, 1925, in the Tyneside area; and how many persons formerly living under slum conditions had been rehoused under these schemes.—Mr. GREENWOOD replied: The information, so far as it is available, is given in the following return showing progress in connexion with slum clearance schemes in the Tyneside area from April 1st, 1925, to Jan. 1st, 1930:—

Local Authority.	Buildings which have been—		New dwellings erected.	Persons required to be rehoused under each scheme.
	Acquired for demolition.	Demolished.		
Wallsend T.C.	165	159	156	723
Gateshead T.C.	103	103	104	375
Tynemouth T.C.	42	42	66	347
Newcastle-upon-Tyne T.C.—				
Pilgrim-street	44	44	149	790
Prudhoe-street	58	58	124	656
Liverpool street	79	70	136	702
Sunderland—				
Flag-lane Area	4	2	100	878
Lawson's-court Area.	—	—	—	246
Total	495	478	835	4717

THURSDAY, JAN. 23RD.

Small-pox.

Mr. DAY asked the Minister of Health whether he could give the number of cases of small-pox notified since Jan. 1st, 1929, in England and Wales, giving separate figures for London and the number of fatal results.—Mr. GREENWOOD replied: During the 52 weeks ended Dec. 28th, 1929, 9066 cases of small-pox were notified in England and Wales (excluding London), and 1903 cases in London. Among these cases 39 deaths occurred which were classified to small-pox. These figures are at present provisional.

Psittacosis in Warwickshire.

Captain EDEN asked the Minister of Health whether his attention had been called to the recent outbreaks of psittacosis in Warwickshire; whether any inquiry into the causes of the disease was being instituted; and what steps he proposed to take.—Mr. GREENWOOD replied: The answer to the first part of the question is in the affirmative. All recent alleged cases of this disease in this country that have come to the notice of my department have been studied, and in some instances medical officers of the Ministry have taken part in the investigations. The question of further administrative action will be considered as soon as the inquiries now in progress are completed.

Captain EDEN: Is it a fact that there is at present no obligation to report these cases once they have been diagnosed to the medical officer of health, and does the right hon.

gentleman not think in view of the seriousness of the disease that notification ought to be made compulsory?

Mr. GREENWOOD: That may be so, but I imagine in all these cases of relatively rare diseases that as soon as they occur they do in fact report them to medical officers of health.

Dr. VERNON DAVIES: Will the right hon. gentleman consider the possibility of inviting all port medical officers of health to pay particular attention to all parrots being brought into this country?

No answer was given.

Slum Clearance.

Major NATHAN asked the Minister of Health when he anticipated that the Government's projected Bill as to slums would be passed into law; and whether meanwhile he was refusing to consider and approve housing schemes submitted by local authorities.—Mr. GREENWOOD replied: I regret that I cannot at present add anything to the statement made on Tuesday by the Prime Minister on the subject of the first part of this question. As regards the second part, no schemes for providing new houses are being delayed in my department by the expectation of the new Bill; but in the case of slum clearance schemes I have in some instances suggested that in view of certain difficulties which have arisen it would be better to await the proposals which I hope shortly to submit to this House.

Operative Experiments on Living Animals.

Mr. LOVAT-FRASER asked the Home Secretary the number of operative experiments on living animals, witnessed by the inspectors under the Cruelty to Animals Act, 1876, during the years 1924–28, inclusive.—Mr. CLYNES replied: The number of operative experiments witnessed by the inspectors during the years mentioned was 769.

Sale of Skimmed-milk Cheese.

Mr. A. M. SAMUEL asked the Minister of Health what steps his department was taking to prohibit the sale of skimmed-milk Dutch cheese without the buyer being made aware at the time of purchase that it was not whole-milk cheese.—Mr. GREENWOOD replied: The sale of skimmed-milk cheese under any description indicating that it is whole-milk cheese would be an offence under the Food and Drugs (Adulteration) Act. I have no power to impose any further requirements as to the sale of this commodity.

Silicosis and Workmen's Compensation.

Mr. HOFFMAN asked the Home Secretary if he had decided to extend the silicosis order under the Workmen's Compensation Acts; and, if so, when would it come into operation.—Mr. CLYNES replied: If, as I assume, my hon. friend refers to the proposed inclusion of employment on the machines known as Slack's machines under the Metal Grinding (Silicosis) Scheme, I have not yet come to any final decision. As my hon. friend knows, a deputation on this question has been received from the representatives of the workers and certain representations on the subject have been received from the Sheffield Employers Association who asked for an interview. This has recently taken place and I have just received a report of the discussion. I will give the matter my immediate consideration, and will communicate with my hon. friend as soon as a decision is reached.

School Medical Services.

Dr. VERNON DAVIES asked the President of the Board of Education if he had made any estimate of the increased personnel and extra cost for the school medical services necessitated by the compulsory raising of the school age.—Sir CHARLES TREVELYAN replied: Although some extension of the existing arrangements will be necessary, I am advised that the raising of the school age will not in itself involve any material increase in the personnel and cost of the school medical service.

Dr. DAVIES: Does that mean that the Board of Education intends to work the present medical staff more fully than they are being worked at present?

Sir C. TREVELYAN: No. I said that there was no reason to suppose that it would involve any material increase in the personnel; that is to say, there will not be an additional school inspection, and therefore no increase of work will be required.

Nursery Schools.

Mr. THOMAS GRIFFITHS asked the President of the Board of Education how many new nursery schools had been approved in the period July to December, 1929, inclusive; what number were now under construction; and the average initial cost of building a new school.—Sir CHARLES TREVELYAN replied: Proposals for nine new nursery schools were approved in the period July 1st to Dec. 31st, 1929. So far as my information goes, there are nine schools at present under construction. The average cost of providing a new nursery school, on the basis of a number of recent examples, is about £34 per place.

Emigrants and Health Insurance.

Sir GODFREY DALRYMPLE-WHITE asked the Minister of Health what arrangements, if any, the Government proposed to make to enable a person insured under the Health Insurance Acts who wished to settle in our Dominions to obtain a transfer of the values standing to his credit with his approved society.—Mr. GREENWOOD replied: There is already statutory provision under which the payment of transfer values may be made in respect of insured persons who emigrate to the Dominions and become insured in a society in the Dominions, subject to corresponding rights being given in respect of insured persons who come from the Dominions to this country. Any claim for the payment of a transfer value under these conditions should be made by the society through whom the emigrant is insured in the Dominions.

Women Factory Inspectors in India.

Major GRAHAM POLE asked the Secretary for India how many of the 39 regular whole-time and nine part-time additional factory inspectors in India were women.—Mr. WEDGWOOD BENN replied: One of the whole-time inspectors is a woman. All the part-time inspectors are men.

MONDAY, JAN. 27TH.

Opium Consumption in Calcutta.

Major GRAHAM POLE asked the Secretary of State for India if he could give information showing the consumption of opium per 10,000 of the population in Calcutta and how this figure compared with the League of Nations' Health Committee's estimate of the limit of legitimate consumption per 10,000 of the population.—Mr. WEDGWOOD BENN replied: The consumption of opium per 10,000 of the population in Calcutta was 86 seers in 1928-29. The League standard, which was suggested for the medical and scientific requirements of countries possessing a highly organised medical system and has little applicability to the conditions of India, was equivalent to about 6 seers per 10,000.

Germany and Psittacosis.

Dr. VERNON DAVIES asked the Minister of Health if he was aware that, owing to the fact that four deaths had taken place in Germany recently from psittacosis, the authorities there had placed a ban upon the import of parrots into that country and if he would consider the advisability of taking similar action in this country.—Miss S. LAWRENCE, Parliamentary Secretary to the Ministry of Health, replied: My right hon. friend has seen newspaper reports to the effect that the action referred to has been taken in Germany, but he has no official information on the subject. As regards the second part of the question, my right hon. friend is not at present in a position to add anything to the answer given on Jan. 23rd.

Sale of Poisonous Disinfectants.

Lord FERMOY asked the Home Secretary if his attention had been called to the increasing sale of poisons in the form of disinfectants and to the fact that suicides from drinking disinfectants had increased from seven in 1918 to 287 in 1928; whether this was a matter now being considered by the inter-departmental committee on the Poison and Pharmacy Acts; when he expected the report of that body; and whether he proposed to schedule such disinfectants among the lists of poisons or to take any other action to limit the free sale of such products.—Mr. CLYNES replied: My attention has not been called to the increasing sales referred to by the noble Lord. The Report of the Departmental Committee on the Poisons and Pharmacy Acts set up by the Lord President of the Council is expected shortly and will be laid before Parliament. Under the existing law I have no power to add to the schedule of poisons, such powers being vested in the Pharmaceutical Society, whose action has to be approved by the Privy Council.

TUESDAY, JAN. 28TH.

Venereal Disease in the Army.

Mr. Cecil WILSON asked the Secretary of State for War whether his attention had been called to the statements in the official Reports on the health of the Army concerning the provision of prophylactic outfits for self-disinfection after exposure, and, in particular, to the statement in the 1925 Health Report on this subject, which showed that out of 968 cases of venereal affection 181 men endeavoured to use the prophylactic outfit but used it incorrectly, that 207 men used it correctly but were infected, and that 580 men, although carefully instructed, did not use the prophylactic; and if, having regard to the youth of many of the personnel of the Army, the repugnance of many people to the State provision of such prophylactic packets, and their doubtful medical value, he would order that such provision be discontinued.—

Mr. T. SHAW replied: I am advised that the method of prevention of venereal disease by means of early disinfection has been shown to be generally efficacious and it has therefore been retained with a view to reducing venereal disease in the Army.

Health of British Troops in Egypt.

Mr. CADOGAN asked the Secretary of State for War whether he was in a position to state where the troops which were destined shortly to leave Alexandria and Cairo were to be quartered; and whether he would give a definite undertaking that the British garrison in these two towns would not be moved until a proper water-supply and adequate arrangements had been made for the health of the troops in their new quarters in the canal zone.—Mr. T. SHAW replied: No general settlement has yet been reached with the Egyptian Government. The answer to the first part of the question is consequently in the negative. As regards the second part, the hon. Member may rest assured that adequate arrangements will always be made for the health and comfort of the troops.

Noise and Public Health.

Mr. FREEMAN asked the Minister of Health whether he intended to introduce legislation dealing with excessive noise caused by faulty machinery, sirens, hooters, mechanical appliances, and other forms of noise inimical to public health.—Miss S. LAWRENCE replied: Other considerations than those of public health arise in regard to such legislation, and in any event the commitments of the Government would render its introduction impracticable.

Pulmonary Tuberculosis in the Navy.

Dr. VERNON DAVIES asked the First Lord of the Admiralty the number of men granted pensions for pulmonary tuberculosis held to be attributable to the conditions of service during each of the last 10 years for which statistics were available; the number of men refused pensions as being non-attributable; and the total number of men in receipt of such pensions at the latest convenient date.—Mr. ALEXANDER replied: The numbers of men invalided for pulmonary tuberculosis and awarded attributable pensions and the numbers refused such pensions for each year since 1924 are as follows:—

	Granted.	Not granted.		Granted.	Not granted.
1924	5	 151	1927	18	 162
1925	2	 187	1928	42	 98
1926	6	 191	1929	177	 83

Statistics for the years prior to 1924 and the numbers of men now actually in receipt of attributable pensions for pulmonary tuberculosis are not available and could not be compiled without a very considerable expenditure of time and labour.

Venereal Disease in the Navy.

Mr. CECIL WILSON asked the First Lord of the Admiralty whether his attention had been drawn to the statements in the official reports on the health of the Navy, which showed that pocket antivenereal outfits, or prophylactic packets for self-disinfection, were provided for the use of all ranks in the Navy, and that definite and detailed instructions were given to the personnel as to the technique of self-disinfection at the time of exposure to venereal infection, and subsquently in the ablution chamber; and if it was proposed to continue these practices in the Navy, having regard to the youth of many of the personnel, the repugnance of many people to the State provision of such facilities, and the fact that the official statistics for the Army showed that many men who had used the prophylactic outfit according to instructions had been infected.—Mr. ALEXANDER replied: The Committee of Inquiry on Venereal Disease, over which Lord Trevethin presided in 1923, concluded that substantial results may reasonably be expected to follow from these prophylactic measures. The Committee did not think that there is any justification for putting obstacles in the way of individuals who desire to procure disinfectants as a measure of protection against venereal disease. It is therefore proposed to continue to provide such facilities for the voluntary use of naval personnel. No coercion is employed to induce men to make use of these facilities. On the other hand, every endeavour is made to warn them of the dangers of promiscuous sexual intercourse by means of lectures, and to inculcate a healthful morale by the provision of organised games, recreation and entertainments at all ports, at home and abroad.

MANCHESTER ROYAL INFIRMARY.—The Trustees invite applications for the Dickinson Research Travelling Scholarship in Medicine, of the value of £300, tenable for one year. Candidates must be University graduates who have taken out their full course of clinical instruction in the Infirmary and in the University of Manchester, and have earned distinction in so doing.

Medical News.

UNIVERSITY OF OXFORD.—On Jan. 23rd the degree of Bachelor of Medicine was conferred on G. Secker-Walker.

UNIVERSITY OF CAMBRIDGE.—On Jan. 24th the following degrees were conferred:—

M.D.—Samuel Levy-Simpson (enacted 1928).*
M.B. & B.Chir.—E. L. Graff, J. I. Sapwell, and T. K. S. Lyle.
B.Chir.—C. D. Politeyan.*

* By proxy.

SOCIETY OF APOTHECARIES OF LONDON.—At recent examinations the following candidates were successful:—

Surgery.—M. Asaad, St. Mary's Hosp.; L. P. Clarke, St. George's Hosp.; K. Graftdyk, Leeds; H. W. Maurer, Charing Cross Hosp.; M. Naylor, Sheffield; M. S. Rappoport, London Hosp.; Z. Risk, Birmingham; T. G. Robinson, Guy's Hosp.; and F. A. Yarde, St. Mary's Hosp.
Medicine.—R. F. M. Child, St. Mary's Hosp.; V. J. H. Coidan, Beyrouth and Paris; C. E. P. Davies and W. J. D'Rosario, Guy's Hosp.; K. Graftdyk, Leeds; C. B. Jennings, Charing Cross Hosp.; A. Kellner, London Hosp.; C. Skinner, Guy's Hosp.; and P. Somasunder, London Hosp.
Forensic Medicine.—T. Chandrasekharen, Madras and Manchester; A. P. Edwards, Liverpool; E. A. Freywirth, Heidelberg; C. B. Jennings, Charing Cross Hosp.; E. Lethem, Guy's Hosp.; and P. Somasunder, London Hosp.
Midwifery.—H. C. Halge, St. Mary's Hosp.; E. Jacomb, Birmingham; E. Lethem, Guy's Hosp.; and M. S. Rappoport, London Hosp.

The Diploma of the Society was granted to the following candidates, entitling them to practise medicine, surgery, and midwifery: R. F. M. Child, C. E. P. Davies, W. J. D'Rosario, A. Kellner, H. W. Maurer, T. G. Robinson, and F. A. Yarde.

ROYAL COLLEGE OF PHYSICIANS OF EDINBURGH, ROYAL COLLEGE OF SURGEONS OF EDINBURGH, AND ROYAL FACULTY OF PHYSICIANS AND SURGEONS OF GLASGOW.—At recent examinations the following candidates were successful:—

FINAL EXAMINATION FOR CONJOINT DIPLOMA.

W. B. Lee, Max Freed, D. P. Dow, Joseph Schwartz, Joseph Kinnear, O. V. Short, W. E. Faulkner, J. H. McGibbon, J. C. Coetzee, L. H. Abeyewardene, Margaret Leslie, T. G. Ward, E. O. Hagedorn, Florence L. M. Millard, H. S. Hamilton, George Henderson, R. F. L. V. Harvey, G. R. Parker, Pieter van der Lith, and Iskandar El-Aroussi.

The following passed in the undermentioned subjects:—

Medicine.—E. T. Buck, W. H. Taylor, G. L. Chadha, B. W. Advani, R. K. Pal, Kamil Kikhail, M. D. D. Jayawardana, Adam Paterson, and J. A. R. Lavoipierre.
Surgery.—B. W. Advani, Adam Paterson, J. A. R. Lavoipierre, N. Y. Labib, and Daniel Millar.
Midwifery.—H. O. Parkinson, W. H. Taylor, G. L. Chadha, S. J. B. Collins, T. Y. Bhide, R. T. A. Morrow, R. K. Pal, Kamil Mikhail, and M. K. Thiruvilangam.
Medical Jurisprudence and Public Health.—J. P. Walsh, E. R. Fothergill, C. M. Douglas, H. W. C. Robertson, T. F. Kirkpatrick, Loutfi Ahmed, A. W. Turnbull, J. T. M. Fenton-Fyffe, G. D. Morgan, G. L. Whitton, B. A. Armitage, and H. L. Lucas.

UNIVERSITY OF LONDON.—A course of six lectures on Cytology in Relation to Physiology and Pathology will be given by Mr. R. J. Ludford, D.Sc., at University College at 5 P.M. on Wednesdays, Feb. 5th, 12th, 19th, 26th, and March 5th and 12th.

GRESHAM LECTURES.—Four lectures on How England Learned to Control Disease will be delivered by Sir George Newman, at 6 p.m., on Feb. 4th, 5th, 6th and 7th, at Gresham College, Basinghall-street, London, E.C.

INNS OF COURT.—Among those called to the Bar on Jan. 27th was Dr. D. McI. Johnson, at Gray's Inn.

ROYAL LONDON OPHTHALMIC HOSPITAL.—The annual dinner of past and present students of this hospital will be held at the Langham Hotel, Portland-place, on Thursday, Feb. 13th, at 7 for 7.30 P.M., with Mr. J. Herbert Fisher, consulting surgeon to the hospital, in the chair. Tickets may be had from Mr. Rupert Scott, 70, Harley-street, W.

PREVENTION OF DEATH IN CHILDBIRTH.—In accordance with the will of the late Dr. Robert Thomas Nichols, the Royal Society of Medicine offers every three years a prize (being the accumulated interest on £2,200) open to any British subject, for a contribution towards the Discovery of the Causes and the Prevention of Death in Childbirth from Septicæmia. Work submitted for the third award must reach the Secretary of the Society (1, Wimpole-street, London, W.1) not later than Oct. 1st. Work published since Oct. 1st, 1927, may be submitted.

UNIVERSITY OF GLASGOW.—The Harry Stewart Hutchison Prize, of the value of about £50, for the best writing or writings embodying Original Research Work in a Branch of Medical Science relating to Children will be awarded in 1931. Medical graduates (of not more than ten years' standing from their first graduation in medicine) of all British, Home, and Colonial Universities may be competitors. Compositions must be submitted, in proper form, to the Clerk of Senate, not later than March 31st, 1931.

MINERS' GIFT FOR TREATMENT OF CANCER.—From the Notts Miners' Welfare Fund a contribution of £3500 has been given in the campaign in Nottinghamshire against cancer, expressly for the purchase of a quarter of a gramme of radium and the necessary appliances to enable the Council in charge to afford priority of treatment to miners and their dependants who may be certified for radium treatment.

LEAD POISONING IN LANCASHIRE.—Dr. W. E. Cooke, pathologist under the Lancashire Insurance Committee's scheme for providing free laboratory diagnosis services for insured persons, states in a report that during the past few months several cases of lead poisoning in the county of Lancashire have come under notice. The common factor in all cases is the habit of drinking from the hot-water service in the home.

THE German Society of Internal Medicine is to hold its forty-second meeting from April 7th–10th at Wiesbaden under the presidency of Prof. Volhard of Frankfurt a.M. The principal subjects put down for discussion are the Pituitary, to be introduced by Trendelenburg (Berlin) and Lichtwitz (Altona); and Focal Infection, to be introduced by Rosenow (Rochester) and Bieling (Frankfurt a.M.). Those who wish to take part are asked to communicate with Prof. Volhard at the Medical Clinic. Following this gathering is a meeting of the German Society of Pædiatrics from April 11th to 14th. Any questions relating to the exhibition, which will be held in common, should be directed to Herr Bürger, Städtische Kurverwaltung, Wiesbaden.

BRITISH COLLEGE OF OBSTETRICIANS AND GYNÆCOLOGISTS.—At a Council meeting held in London on Jan. 21st it was reported by the honorary secretary that a large number of names had been received from the Dominions in regard to the election of Foundation Fellows and Members of the College.—Memoranda concerning the use of anæsthetics in labour and also maternal mortality, drafted at the request of the Ministry of Health, were submitted to the Council by a special committee elected for the purpose and were passed by the Council.—It was agreed that the election of the Council by popular vote should take place in May as foreshadowed at the annual meeting held in December last.

DONATIONS AND BEQUESTS.—Lieut.-Colonel W. B. Brocklehurst, of Prestbury, near Macclesfield, left, among other bequests, £1000 to the Macclesfield General Infirmary Endowment Fund.—Mr. Arthur Jowett, of Windy Bank, Batley, Yorkshire, left £1000 to the Batley and District Hospital for the purpose of endowing a bed to be known as the "Arthur, Mary, and Carrie Jowett" bed; and £1000 similarly to the Dewsbury Infirmary.—Mrs. Mary Elizabeth Christie-Miller left £1000 to the Queen Charlotte Lying-in Hospital.—The Royal Manchester Children's Hospital has received £1000 from the executors of the late Mr. Christopher Higginbottom, and £1000 from the executors of the late Mr. Joseph Hugh Monk.—Mr. William Bell, of Wallasey, left £2000 to his niece, Katherine Jane Guthrie "to be used as she may think fit for medical research" and £100 to Victoria Central Hospital, Wallasey.

NATIONAL MARK MALT EXTRACT.—The following statement has been circulated from the Ministry of Agriculture: "With the coöperation of the Retail Pharmaceutists' Union, the Ministry of Agriculture and Fisheries has issued to over 7500 retail pharmaceutists in England and Wales a letter, inviting their coöperation in placing upon the market National Mark malt extract (with oil) which is now being produced by a large number of malt extract manufacturers in this country. The malt extract is made entirely from home-grown barley to very high pharmaceutical standards designed to ensure the maximum nutritive and medicinal value for the product. National Mark malt extract and oil has been available since Jan. 8th last, and already very encouraging reports have reached the Ministry of its reception by the pharmaceutical trade. The National Mark Malt Extract Scheme is of great benefit to the public in establishing guaranteed high standards for a food and medicine which is in universal demand. In order to be sure that they are obtaining the genuine article, all purchasers of National Mark pharmaceutical malt extract and oil should look for the dark blue ribbon and seal with a National Mark which is placed upon all genuine supplies."

Medical Diary.

Information to be included in this column should reach us in proper form on Tuesday, and cannot appear if it reaches us later than the first post on Wednesday morning.

SOCIETIES.

ROYAL SOCIETY OF MEDICINE, 1, Wimpole-street, W.

TUESDAY, Feb. 4th.—5.30 P.M., ORTHOPÆDICS. (Cases at 4.30 P.M.) 8 P.M., PATHOLOGY. Meeting at the London School of Hygiene and Tropical Medicine, Keppel-street, W.C. Communications: Dr. J. G. Thomson: The Cultivation of *Herpetomonas culicidarium*. Dr. P. A. Buxton: A Case of Extensive Destruction of Bone Resulting from a Chronic Ulcer of the Leg in a South Pacific Islander. Dr. Ordmann: Pneumococcal Infections in Johannesburg. Mr. R. Lovell: A Bacillus of the Salmonella Group Causing Abortion in Ewes. Demonstrations: Dr. J. T. Duncan: Specimens Illustrating Mycetoma and Blastomycosis. Dr. G. S. Wilson: Apparatus for the Continuous Passage of Gaseous Mixtures through Cultures of Bacteria in a Liquid Medium. Dr. G. S. Wilson: Apparatus for the Growth of *Br. abortus* in Atmospheres Containing CO_2.

WEDNESDAY.—5 P.M., HISTORY OF MEDICINE. Paper: Mr. F. Prescott: Spallanzani on Spontaneous Generation and Digestion. 8.30 P.M., SURGERY. Discussion on Intrathoracic Tumours. Openers: Mr. Tudor Edwards and Mr. W. H. C. Romanis. Followed by Dr. L. S. T. Burrell and Dr. F. G. Chandler.

THURSDAY.—8 P.M., TROPICAL DISEASES. Papers: Dr. M. F. Sorour: Bilharzial Lesions of Blood-vessels. (Illustrated by lantern slides.) Dr. J. Gordon Thomson: Notes on a Visit to the Antimalarial Work in Italy. (Illustrated by lantern slides.)

FRIDAY.—10.30 A.M., OTOLOGY. (Cases at 9.30 A.M.) Discussion on Brain Abscess. Papers by Prof. Neumann (Vienna), Mr. E. Miles Atkinson, and Mr. H. W. B. Cairns. Cases will be shown by Sir James Dundas-Grant and Mr. C. Hamblen Thomas. 5 P.M., LARYNGOLOGY. (Cases at 4 P.M.) Cases will be shown by Dr. Dan McKenzie, Mr. O. Popper, Miss McLeod, Mr. V. E. Negus, Mr. E. Watson-Williams, Mr. M. Vlasto, and others. 8.30 P.M., ANÆSTHETICS. Discussion on Anæsthesia in Thoracic Surgery. Openers: Mr. C Langton Hewer and Mr. I. W. Magill. SURGERY. Members of the Section of Surgery are specially invited to be present.

ROYAL INSTITUTION, 21, Albemarle-street, W.

FRIDAY, Feb. 7th.—9 P.M., Dr. Leonard Hill: Diving.

ROYAL MEDICO-PSYCHOLOGICAL ASSOCIATION.

TUESDAY, Feb. 4th.—2.30 P.M., Quarterly General Meeting at David Lewis Colony, Warford, Cheshire. Dr. Alan McDougall: The Why of Conduct. Dr. Richard Handley: Pineal Cysts. Major D. E. Dhunjibhoy: Types of Insanity in India.

LECTURES, ADDRESSES, DEMONSTRATIONS, &c.

ROYAL COLLEGE OF SURGEONS OF ENGLAND, Lincoln's Inn, W.C. (Hunterian Lectures).

MONDAY, Feb. 3rd.—5 P.M., Prof. Geoffrey Keynes: Radium Treatment of Carcinoma of the Breast.

WEDNESDAY.—5 P.M., Prof. J. Herbert Fisher: Perforating Injuries of the Eyeball.

FRIDAY.—5 P.M., Sir John Rose Bradford: Massive Collapse of the Lung.

FELLOWSHIP OF MEDICINE AND POST-GRADUATE MEDICAL ASSOCIATION, 1, Wimpole-street, W.

MONDAY, Feb. 33rd, to SATURDAY, Feb. 8th—MEDICAL SOCIETY OF LONDON, 11, Chandos-street, Cavendish-square, W. Tues., 4 P.M., Lecture by Prof. Hugh MacLean: The Present Position of Gastric Physiology and its Bearing on Gastric Diseases. No fee.—ST. MARK'S HOSPITAL, City-road, E.C. Thurs., 5 P.M., Clinical demonstrations by Mr. E. T. C. Milligan. No fee.—BROMPTON HOSPITAL, S.W. Sat., 3 P.M. (in the theatre), Dr. Batty Shaw will demonstrate on Allergic Pneumonia. No fee.—BETHLEM ROYAL HOSPITAL, S.E. Special course in Psychological Medicine. Tues. and Sat., lecture-demonstrations at 11 A.M.

NORTH-EAST LONDON POST-GRADUATE COLLEGE, Prince of Wales's General Hospital, Tottenham, N.

MONDAY, Feb. 3rd.—2.30 to 5 P.M.: Medical, Surgical, and Gynecological Clinics. Operations.

TUESDAY.—2.30 to 5 P.M.: Medical, Surgical, Ear, Nose and Throat Clinics. Operations.

WEDNESDAY.—2.30 to 5 P.M.: Medical, Skin, and Eye Clinics. Operations.

THURSDAY.—11.30 A.M.: Dental Clinics. 2.30 to 5 P.M.: Medical, Surgical, Nose, Throat and Ear Clinics. Operations.

FRIDAY.—10.30 A.M.: Throat, Nose and Ear Clinics. 2.30 to 5 P.M.: Surgical, Medical, and Children's Diseases. Clinics. Operations.

SOUTH-WEST LONDON POST-GRADUATE ASSOCIATION.

WEDNESDAY, Feb. 5th.—4 P.M. (at St. James's Hospital, Ouseley-road, Balham, S.W.), Dr. Ronald G. Canti: Demonstration of the Cinematograph Film on the Biological Aspect of Radium.

UNIVERSITY COLLEGE, Gower-street, W.C.
MONDAY, Feb. 3rd.—5 P.M., Prof. A. V. Hill: Oxygen and the Recovery Process in Muscle and Nerve. (Third of four public lectures.)

KING'S COLLEGE HOSPITAL MEDICAL SCHOOL, Denmark Hill, S.E.
THURSDAY, Feb. 6th.—9 P.M., Mr. J. M. Bickerton: Diseases of the Eye in General Practice.

ROYAL NORTHERN HOSPITAL, Holloway.
TUESDAY, Feb. 4th.—3.15 P.M., Mr. F. D. Saner: Colonic Ptosis and Its Results.

LONDON SCHOOL OF DERMATOLOGY, St. John's Hospital, 49, Leicester-square, W.C.
TUESDAY, Feb. 4th.—5 P.M., Dr. S. E. Dore: Affections of the Hair and Hair Follicles.
THURSDAY.—5 P.M., Dr. A. M. H. Gray: Xanthoma. Herpes.

CENTRAL LONDON THROAT, NOSE, AND EAR HOSPITAL, Gray's Inn-road, W.C.
MONDAY, Feb. 3rd.—1.30 P.M., The Ear: Examination and Diagnosis.
WEDNESDAY.—1.30 P.M., The Nose: Examination and Diagnosis.

ST. MARY'S HOSPITALS, Manchester.
FRIDAY, Feb. 7th.—4.30 P.M., Post-graduate Lecture (at the Whitworth-street West Branch), Dr. C. P. Brentnall: Abortion.

SHEFFIELD POST-GRADUATE LECTURES ON CANCER.
TUESDAY, Feb. 4th.—8.45 P.M. (in the Physics Lecture Room of the University of Sheffield), Sir Lenthal Cheatle: The Treatment of Mammary Carcinoma by Radiation.

SHEFFIELD POST-GRADUATE CLINIC.
FRIDAY, Feb. 7th.—3.30 P.M. (at the Royal Infirmary), Dr. Barnes: Clinical Forms of Nephritis.

GLASGOW POST-GRADUATE MEDICAL ASSOCIATION.
WEDNESDAY, Feb. 5th.—4.15 P.M. (at the Royal Hospital for Sick Children), Mr. A. MacLennan: Surgical Cases.

Appointments.

NISBET, B. R., M.D., Ch.B. Edin., D.P.H., has been appointed Medical Officer of Health for Kilmarnock.

Certifying surgeons under the Factory and Workshop Acts: BROSTER, E. D., L.R.C.P. Lond., M.R.C.S. (Wirksworth); FISHER, A. R., L.R.C.P. Lond., M.R.C.S. (Dover); and MANNING, H. P. O., L.R.C.P. Lond., M.R.C.S. (Faversham).

Vacancies.

For further information refer to the advertisement columns.

Accrington, Victoria Hospital.—H.S. £150.
Birmingham City and University, Joint Board of Research for Mental Disease.—Histological Asst. £4 weekly.
Birmingham General Hospital.—Res. Surg. Reg. £120–£140.
Birmingham, Queen's Hospital.—Third Phys. to Out-patients and Third Surg. to Out-patients. Each £50.
Bootle Borough Hospital, Derby-road.—Sen. Res. M.O. Also Two Jun. H.S.'s At rate of £200 and £125 respectively.
Bradford, Royal Eye and Ear Hospital.—Jun. H.S. £150.
Bristol Eye Hospital.—H.S. £150.
Bristol Royal Infirmary.—H.P.'s and H.S.'s, &c. Each at rate of £60. Cas. H.S. and Dental H.S. Each at rate of £80.
Buxton, Devonshire Hospital.—Asst. H.P. At rate of £150.
Central London Throat, Nose, and Ear Hospital, Gray's Inn-road, W.C.—Out-patient Statistical Registrar. First Asst. to Out-patients. Also Res. H.S. At rate of £75.
Chelmsford, County Council of Essex and U.D.C. of Chingford.—Asst. County M.O.H., &c. £800.
Chelsea Health Soc. and School for Mothers.—M.O.
Chester Royal Infirmary.—H.S. £150.
Croydon County Borough.—Asst. M.O., &c. £600.
Derby, Bretby Hall Orthopædic Hospital.—Asst. M.O. At rate of £150.
Derby, Derbyshire Hospital for Sick Children.—Res. M.O. At rate of £150.
Derby, Derbyshire Royal Infirmary.—Ophth. H.S. H.S. Also Asst. H.S. Each £150.
Doncaster Royal Infirmary.—Second H.S. £150.
Ealing, Borough of.—Asst. M.O.H. £600.
Eastbourne, Princess Alice Memorial Hospital.—Sen. H.S. At rate of £125.
Evelina Hospital for Children, Southwark, S.E.—H.P. At rate of £120.
Exeter, Royal Devon and Exeter Hospital.—H.P. At rate of £150.
Huddersfield Royal Infirmary.—H.S. At rate of £150.
Hull Royal Infirmary.—Cas. H.S. At rate of £130.
Ilford, King George Hospital.—Second H.S. At rate of £100.
Indian State Railways.—Dist. M.O. Rs. 650 per mensem.
Ipswich, East Suffolk and Ipswich Hospital.—Cas. O. £150.
King's Lynn, West Norfolk and King's Lynn Hospital.—Hon. Physician.
Leeds, Tuberculosis Sanatorium, Killingbeck.—Asst. Res. M.O. £250.
Liverpool, David Lewis Northern Hospital, Clinical School.—Med. Tutor and Registrar. £175.
Liverpool, Royal Liverpool Children's Hospital, Myrtle-street.—Res. Cas. O. £250.
London Jewish Hospital, Stepney Green, E. Cas. O. At rate of £150.
London School of Hygiene and Tropical Medicine.—Demonstrator in Division of Bacteriology and Immunology. £400.
London Temperance Hospital, Hampstead-road, N.W.—Cas. O. At rate of £120.
Macclesfield General Infirmary.—2nd H.S. At rate of £150.
Manchester, Ancoats Hospital.—Res. M.O. £150. Also Orthopædic H.S. Also H.S. Each at rate of £100.
Manchester, Park Hospital, Davyhulme.—Jun. Res. M.O. At rate of £200.
Manchester Royal Infirmary.—Dickinson Scholarships, Research Travelling Scholarship in Medicine. £300. Also Pathology Scholarship. £75.
Miller General Hospital, Greenwich-road, S.E.—Res. M.O., Cas. O., and H.P. At rate of £250, £150, and £125 respectively.
National Hospital, Queen-square, W.C.—Hon. Dental Surgeon.
Newcastle-on-Tyne, Wooley Sanatorium, near Hexham.—Asst. M.O. £350.
Newcastle-upon-Tyne, Royal Victoria Infirmary.—Six Jun. Surg. Regs. Each £150.
Northern Rhodesia, Roan Antelope Copper Mines, Ltd.—Jun. M.O. £900–£1000.
Norwich, Norfolk and Norwich Hospital.—Hon. Surg. Also H.S. £120.
North Middlesex Hospital, Edmonton, N.—Second Radiographer. £250.
Nottingham Hospital for Women.—H.S. At rate of £150.
Oxford City.—Deputy M.O.H. £600.
Plymouth, South Devon and East Cornwall Hospital.—Hon. Asst. Surg. for Obstet. and Gynæcological Depts.
Royal Northern Hospital, Holloway, N.—H.S., Res. Out-Patient Cas. O. and Anæsthetist. Each at rate of £70.
St. Bartholomew's Hospital, E.C.—Clin. Asst. to Venereal Dept. One Guinea per session.
Salford Royal Hospital.—H.S. At rate of £125.
Sheffield Royal Hospital.—Ophth. H.S. Also Res. Anæsthetist. Each at rate of £80.
Sheffield Union Hospital.—Res. Asst. M.O. £250.
Stirling District Mental Hospital, Larbert.—Jun. Asst. M.O. £300.
Stoke-on-Trent City Education Committee.—Asst. School M.O. £500.
Stroud General Hospital, Glos.—H.S. At rate of £150.
Taunton and Somerset Hospital.—Jun. House M.O. At rate of £100.
Walsall County Borough.—Asst. M.O. £600.
Warrington Infirmary and Dispensary.—Jun. H.S. £175.
Westminster Hospital, Broad Sanctuary, S.W.—Asst. Surg. Reg. At rate of £50. Also Orthopædic Surgeon.
Windsor, King Edward VII Hospital.—H.S. At rate of £100.

The Chief Inspector of Factories announces a vacancy for a Certifying Factory Surgeon at East Linton (E. Lothian).

Births, Marriages, and Deaths.

BIRTHS.

DENDY.—On Jan. 19th, at Glyn Eithin, Mumbles, the wife of Dr. E. H. Dendy, of a daughter.
HALLIWELL.—On Jan. 21st, at Welbeck-street, W., the wife of Arthur C. Halliwell, F.R.C.S., of a son.
MIALL-SMITH.—On Jan. 22nd, to Dr. Gladys Miall-Smith, of Welwyn Garden City, the wife of Dr. H. J. B. Fry—a daughter.
PETIT.—On Jan. 22nd, at a nursing home, New Malden, the wife of Dr. Petit, "Dunurlin," New Malden, of a son.
WARBURTON.—On Jan. 22nd, at Cotley, Streatham Hall, Exeter, the wife of P. D. Warburton, M.R.C.S., D.P.H., of a son.
WHITMAN.—On Jan. 24th, at Stoneboro' Cardiff, the wife of Dr. V. E. Whitman, Gold Coast Medical Service, of a daughter.

MARRIAGES.

PURNELL—GOLDSMID.—On Jan. 25th, at the Parish Church of St. Nicholas, Chiswick, Purnell Purnell, M.R.C.S., L.R.C.P., of Leigham Court-road, Streatham, to Ivy Florence, only daughter of George Campbell Goldsmid, of Bedford Park, Chiswick.

DEATHS.

BELL.—On Jan. 22nd, John Henderson Bell, M.D., of 3, Carlyle-square, London, S.W.3.
BOOBBYER.—On Jan. 21st, suddenly, at Wellington-square, Nottingham, Philip Boobbyer, M.D., in his 73rd year.
EIDINOW.—On Jan. 23rd, suddenly, at Ferncroft-avenue, Hampstead, N.W., William Eidinow, M.R.C.S. Eng., L.R.C.P. Lond., late of Colebrook-road, Islington, N.
JONES.—On Jan. 24th, at Aviemore, Hanwell, and of Cravenhill, W., Henry Cadwaladr Jones, L.D.S. R.C.S. Eng., aged 56.
RIDDELL.—On Jan. 24th, at his residence, Westfields, Sandbach, Dr. Robert Riddell, aged 61 years.
WALLACE.—On Jan. 22nd, at his residence, Wallacefield, Belle Vue-road, Paignton, Dr. Abraham Wallace, aged 80 years.

N.B.—A fee of 7s. 6d. is charged for the insertion of Notices of Births, Marriages, and Deaths.

Notes, Comments, and Abstracts.

THE HISTOLOGICAL BASIS OF HEALTH.*

II. Cell-differentiation; The Nervous System in Relation to Health.

By Prof. J. BOEKE,

DIRECTOR OF THE LABORATORY OF EMBRYOLOGY AND HISTOLOGY OF THE UNIVERSITY OF UTRECHT, HOLLAND.

As soon as we begin to discuss the problems of development and growth and their bearing on the problem of health, we must concentrate our thoughts on the wonderful phenomenon of the gradual differentiation of the cellular units. Growth may be represented by a mathematical formula, and identified as a chemical process. The formula of Robertson may be used as well for cellular growth as for the relation of the different organs to the body in growth, as long as we take into account only that part of the process which we may safely compare with the physico-chemical processes in nature, and try to trace the broad outlines of the chemical changes underlying growth. But as soon as we speak of the differentiation of the tissues, which leads us to an ever-increasing and ever more complicated inter-relation of the parts of the body to the body as a whole, and a much more complex relation of the organism to the outside world, we have approached one of the fundamental problems of existence. The endowments which bring us into relation with the external world make our internal life so complex that we feel that no mathematical formula will ever describe these relations. We touch the fundamental mysteries of existence; we are hovering on the outskirts of our human conceptions, and we shall never press beyond them, even when perhaps in time the limit to which we are able to go may be moved a little farther back, and some of the things which are at present utterly mysterious and incomprehensible will be comprehended and explained so that we may express them by a formula.

Differentiation—the Secret.

In differentiation lies the secret of life, of death, of health, for it is the most intrinsic factor of the organism. Without differentiation no life is possible, but death is the price. In 1911 Carrel, the well-known experimentalist, took a small piece of tissue from the living developing egg of a fowl, put it under a cover-glass in a drop of sterile nutritive fluid and kept it there at a temperature of 38° C. It remained alive and continued to grow and every day a small piece of the living culture was cut off and put into a fresh drop of the nutritive fluid. These pieces of living tissue continued to grow, and a number of them are still growing after 18 years. If all the living tissue produced by the growth of this small original piece of embryonic tissue had remained alive and growing at the same rate as the few pieces left to survive, a quantity of living material would have been produced many times as large as the terrestrial globe. Thus a piece of embryonic tissue continues to grow and has now been growing for a longer period than the life-duration of the fowl from which the original piece was taken. But it does not differentiate; it simply grows and multiplies and is practically immortal. If the piece of tissue had remained in the embryo, it would in the course of a few weeks have developed into a chicken—viz., into an organism of a distinct, harmonious, and differentiated form. But with the inauguration of this differentiated form death has come into action. Even in its sheltered environment the duration of life of the common domestic fowl is not more than six to nine years.[1] The same thing is seen in cultures of different cell-types outside the organism. In the ordinary plasma and fluid media the general character of the outgrowth of different cell-types taken from the living organism varies with, and is more or less characteristic for, each cell-type. Lewis assures us that it is now possible in most instances to identify the outgrowth—i.e., the specific cell-type involved, by the patterns formed by the cells in their relation to one another. Nevertheless, as a rule, differentiated cells lose their peculiar character, and grow out as common elongated branched cells without a distinct differentiation. They never form differentiated organs or functional units as in the body.

Differentiation, therefore, is the leading feature of the organism. Development is nothing but differentiation; we may define it as physiological division of labour and as morphological division of substance, but these are merely two aspects of the same thing, and in life they are actually inseparable. The synthetic cause of differentiation is, of course, the organism itself, but in the last analysis all differentiations are probably the results of chemical changes in the protoplasm and in the metaplasmic substances. So we may conclude that, in general, differentiation and diversity of cells originate in a diversity of relationships between nucleus and protoplasm. The relation between the size of the nucleus and the amount of protoplasm in differentiated cells and in functional units is nearly always quite different from that in undifferentiated cells. This change in the nucleo-protoplasmic relation alters the assimilative powers of the protoplasm and the autocatalyst level, so that the regenerative power of the tissues of any given species diminishes with their differentiation. The more highly differentiated the tissue, the less is the variety of tissues to which it can give rise when injury calls forth repair. In general, the potential morphological complexity of a cell stands in inverse relation to its degree of physiological differentiation (Robertson). Morphological differentiation may be the consequence of preceding physiological differentiation, followed by the assumption of specialised function, and this implies the performance of more and more limited functions, and so the exercise of more limited morphological potentialities.

But these are only generalities, and in the end do not give us any clear insight into the relation of differentiation to the problem of health. Even the remarkable relation between the nuclear ratio in the cells and the occurrence and frequency of cell division, important as it is in itself, does not throw much light on the problem. Of the highest importance, however, is the influence which a number of substances in the body, especially hormones, exert on the differentiation of the tissues. Normal differentiation during development is the result of hormonic influences; in mammals the maternal hormones may pass into the developing embryo and alter its differentiations, and the sex-hormones of the male embryo of a pair of twins in cattle may pass into the body of the female embryo and alter its secondary sexual characters (free-martins). Even the histological type of the epithelia of the adult body may be changed by hormones introduced into the body; a diet characterised by the absence of vitamin A may cause the epithelia of different mucous membranes to become stratified. Embryonic tissues may form hormones which cause other embryonic tissues coming into contact with them to differentiate in a certain way. The important feature of this process of induction seems to me to be that the differentiation induced is a differentiation other than that of the cells producing the hormones themselves. The hormone produced by a certain cell does not influence the cell itself in its differentiation, but may cause other cells, apparently as highly specialised as the cell itself, to alter their developmental course of differentiation and form another organ or functional unit.

We may safely say that everywhere in the processes of differentiation hormones play a most important part and, indeed, even the characteristics of the human race have been put down to the action of the different hormones produced by the endocrine organs. These hormones may actually enter into the composition of the protoplasm of the cells which they affect, and so become an essential constituent of the living substance. But even if we can trace a certain differentiation down to the action of a distinct hormone, the character of the differentiation itself is not in the least explained, nor is there an answer to the question why and how during development and growth the different hormones and other substances, by which those processes seemingly are regulated, are formed just where and when they are needed, so that the harmonious form of the organism is developed and remains harmonious during growth.

The same thing may be said of malign tumours. It seems very probable nowadays that these tumours arise as the result of stimuli which cause an abnormal proliferation of cells, with all its mediate and immediate effects. Thus the application of soot or tar to the skin may induce cancer of the skin in mice and, as Bonne showed, in monkeys, and indeed in man, and a number of substances of various kinds may induce this hyper-differentiation and cell proliferation. Among these are different hormones and substances (as the "auxetics" of Ross in tar) which cause inflammatory reactions and abnormal cell proliferation, while such other substances as tethelin cause retardation of the growth of the cancer cells. We could, therefore, try to bring the problem of cancer growth down to that of the nuclear ratio and the autocatalyst level, and so to the general problem of growth, and to an acceleration of senescence of the hyper-differentiated cancer cells. But the cancer problem is so extensive and difficult that I must confine myself here to these generalities, for every detail of the problem would require a lecture in itself to make it clear and to discuss it.

The Histological Basis of Health in the Nervous System.

At first sight no other element of the human body shows so many contradictions, when looked at from this point of

* Being the second of two lectures (illustrated by lantern slides) delivered in London under the Chadwick Trust (slightly abridged).

[1] A case is reported of a cock surviving for 20 years.

view, as the nervous system. Nervous tissue, according to Child, has an exceptionally high metabolic rate and, as is well known, is extremely sensitive to lack of oxygen. On the other hand, even in inanition the nervous tissue resists destructive forces longer than any other. The cells of the nervous tissue possess a very high nuclear ratio, not only in development but also in the adult stage. And yet, after they are formed, the nerve-cells as a rule do not proliferate any more; they remain unaltered as long as the body itself lives, whereas most of the body cells have a far shorter life duration than the body as a whole. So the nerve-cells are permanent, and yet no cells show so markedly the effects of old age. Indeed, by a number of authors senescence and physiological death is attributed chiefly to the breakdown of the nervous tissue, death through old age being a cerebral phenomenon due to alterations of the nerve-cells. On the other hand, longevity, as exhibited by man and different species of animals, is, according to Friedenthal, in close correspondence with the "cephalisation-factor"; that is, with a high degree of development of the nervous system and of the ratio of the weight of the brain to the weight of the body. Seen from a morphological standpoint, the nerve-cells are among the least differentiated of animal cells; seen from a physiological standpoint, they are the highest differentiated cells of the animal body, and their function is the most finely adjusted and equilibrated function of the organism. Once formed, they show a marked tendency to remain unaltered during the lifetime of the organism, and yet in tissue cultures of embryonic tissues the nerve-cells are almost the only ones to show a distinct differentiation. As Lawrentjew showed quite recently, a nerve-cell in tissue culture may show a real innervation of a mesoblast cell by an outgrowth which penetrates into the mesoblast cell and forms an end-organ in the protoplasm. Nervous tissue is the only tissue which shows strongly marked regenerative powers in mammals, even in adult animals. The nerve-cells are extremely sensitive to lack of oxygen, yet only exceptionally do we see blood-vessels in close connexion with nervous elements, the capillaries as a rule remaining at some distance from the nerve-cells while the large arteries do not even enter the central nervous system. Nerve-cells, as far as we can judge, keep their form unaltered from youth to old age, and yet the functions of what we call our memory require a constant changing of the finer structure of the cells and their connexions as long as we are capable of learning something new. In short, we seem to see contradictions everywhere; every problem we have discussed takes on quite a different aspect when applied to the study of the nervous system.

Can we apply to the nervous system the idea of harmony between the elements constituting the body? As early as 1877 G. H. Lewes, in his book on the Physical Basis of Mind, conceived the idea of a struggle for life between the various cells constituting the organism and a consequent physiological selection of the fittest elements. Roux afterwards took up this conception and utilised it to interpret the differentiation of the nervous system. At first sight we are sorely tempted to say that Lewes was right, and that especially in the nervous system this struggle for life is raging from the beginning to the end of life, and that by this struggle the entire function of the system is regulated, although, of course, not in the sense of the original conception of Lewes 60 years ago.

The tissue in the central nervous system is differentiated into two kinds of cellular elements: (*a*) the ganglion cells, the true nervous elements, with their cell processes—the branched dendrites—conducting the stimuli towards the cell body, and the neurite or axon conducting it to other nerve-cells or to the peripheral nerves (which are nothing else but bundles of these neurites); and (*b*) the neuroglia cells, supporting elements, not used in the processes of transmission of nervous stimuli but of the highest importance for nutrition. The ganglion cells are often in very close connexion with neuroglia cells, which enclose the ganglion cell as a capsule and thus separate it from the surrounding tissue which carries the nutritive blood-vessels. So the ganglion cell is dependent on these capsule cells for its nutrition and oxygen-supply, and there is established a very intimate and harmonious connexion between them; the neuroglia cells, as Holmgren showed, often sending into the ganglion cells processes by which nutritive agents may be introduced into the protoplasm of the ganglion cells and dissimilation products expelled.

When old age sets in, there often seems to spring up between the two kinds of elements a disharmony, a struggle, in which the ganglion cell loses ground and shrivels, while the capsule cells multiply, push into the cell body of the ganglion cell and eat it up, until the shrunken ganglion cell is nearly filled with capsule cells, and in the end perishes and disappears. This contest occurs both in apparent health and in certain diseases. This process of *neuronophagy*, or the eating up of the ganglion cells, is one of the most interesting phenomena of the incipient senescence of the nervous system, and one of the most suggestive phenomena of the alterations which help to bring the life of the organism to a close.

Harmony in the Nervous System.

Neuronophagy is not in reality a struggle for mastery between the nervous elements and their supporting cells; it is simply a supreme effort to keep up the harmony, which is in danger of being broken by the diminishing vitality of the ganglion cells as the result of the incipient dissolution of old age. This wonderful harmony of function between the neuroglia elements and the nerve-cells is seen everywhere in the nervous system. One of the contradictory phenomena of the central nervous system is that the ganglion cells, which have a high metabolic rate and are extremely susceptible to lack of oxygen, are, as a rule, not surrounded by blood-vessels like, for example, the muscular elements, but the blood-vessels nearly always lie at some distance. Here the nutritive function of the neuroglia cells is shown in the most striking way. We often find an arborescent glial cell which is attached very firmly to the wall of a blood-vessel by one of its cell processes; with its cell body it is applied as closely as possible to a ganglion cell, covering it as far as possible by its branching cell processes. We can only interpret these extremely suggestive pictures by supposing that substances are passing from the blood-vessels through the protoplasm of the glial cell to the protoplasm of the ganglion cell and vice versa, just as in the case of the capsule cells.

Properly to exercise the nervous function—the conducting and transformation of nervous stimuli—the ganglion cell must not only be supplied with abundant nourishment and oxygen, but the conducting cell processes, the neurites, must also be sheltered and isolated from injurious influences, chiefly chemical, in the surrounding elements. Here, too, the glial cells are of the highest importance. They encircle the axons and form isolating substances of a lipoid character—the myelin—which enwrap the neurites. During the development of the nervous system the glial cells grow out from the central nervous tube and form a syncytial arrangement with the outgrowing nerve-cell processes themselves, following them to the end-organs, and in this syncytium they form the same isolating substances in order to keep the nerve-fibres free from injury and able to fulfil their function properly. When the more important parts of the nervous system come into function (after birth) the glial cells show such a marked acceleration of chemical activity that many of them are filled up entirely with the products of these chemical dissociations, loosen themselves out of the continuity of the glial system, and are found as "granule cells," lying free between the other elements of the nervous tissue. That in pathological cases these cells become more abundant and form a typical feature of irritated parts of the brain is no argument against the view that all these phenomena are to be explained as so many efforts to preserve the harmony and equilibrium between the functional and the nutritious elements.

No other tissue in the body presents such striking instances of this harmony between form and function as the nervous system, just because its function is the most complex and the most finely adjusted of all. Let me illustrate this by one of its most striking examples. The branched nerve-cells (multipolar cells) in the central nervous system are, as a rule, distinguished in different places by their peculiar form and arrangement. Indeed, the regular function of the parts of the nervous system depends not only on the form of the cells but in no less a degree on their arrangement, as the function of a watch depends not only on the form of the wheels but also on their arrangement in a definite order. For instance, in the cortex of the cerebellum there is a very remarkable arrangement of the cells which shows the same character throughout the whole cortex, whilst the form and shape of the cells, the extension and form of the cell processes, and their place in the cortex is as fixed as the arrangement of the different elements. It forms a pattern, a structure of the most strongly marked regularity. This we can understand when we bear in mind that one of the functions of the cerebellum is to regulate and coördinate the stimuli sent out by the cerebral cortex, so that coördinated movements of the different parts of the body result. Now in most animals after birth the movements are, for the greater part, not yet coördinated, and the coördination develops only slowly. The definite regular arrangement of the cells in the cortex of the cerebellum also develops very slowly. But a chicken, for example, must be able to stand, walk, pick up its own crumbs, and drink water as soon as it is hatched; in short, its movements must be coördinated immediately after birth. Yet two days before birth the cerebellum, which has only had such a short period for development, is still in an extremely undeveloped embryonic state. Development of the regular structure sets in all at once and the cells change to their definite form as a flower unfolds itself out of the bud when the sun is shining. They change place, arranging themselves in their definite pattern so quickly that they seem to fall through the surrounding glial tissue like raindrops from the sky, and leave

hollow strands behind them. Within 24 hours the embryonic mass of cells is changed into the definite structure characteristic of the adult cerebellar cortex, and when the chicken is hatched it is able to live its own life, to walk, to run, to eat, and to take shelter under the wings of the mother hen.

The same phenomenon may be met with everywhere in the cerebral cortex, though the rate of growth is usually not so quick as in the avian cerebellum. The chief and most important factor of growth in the central nervous system is that it is an organised growth, that there is formed everywhere a distinct and most complex structure in which every cell has its allotted place and forms its own special synapses and which changes its features in every part of the brain, so that a specialist may tell from which region of the brain a section is taken by looking at a microscopic preparation made from it. In this process of growth there is nothing to indicate that a struggle between the different cells is going on, in which the "fittest" or "strongest" cell survives and takes the place of its weaker brothers, as was the dogma—the slogan—of biologists in the nineteenth century. On the contrary, we see everywhere the most exquisite harmony, in which every detail of structure has its own value according to the relation of its function to the function of the whole. When we study the development of the structure of the brain and its histology from this point of view, we can understand why it is impossible that there should be a constant renewal of the elements of the nervous system like that of many organs where, even in such compact structures as the epithelia, a continuous covering of the underlying tissues without defects is necessary and a constant dying-off and renewal of the cells is taking place. Every ganglion cell has its allotted and fixed shape and place, and when a part of the brain has reached its definite structure this must be fixed and permanent during the life of the cells which have combined to build up the structure. When a cell is lost by senescence, inflammation, or neuronophagy its place remains empty and cannot be filled up by another element. Thus, the loss of nervous elements in senescence is and must be irreparable and we can understand why many authors saw in this destruction of the nervous elements the true cause of natural death. On the other hand, the process of growth must be otherwise than in those organs in which a constant renewal and increase of cellular elements takes place. The brain is fully developed far earlier in life than the other tissues of the body. After it has been fully formed the ganglion cells of which it is built up seem to be fixed, unalterable units.

Memory and Mental Development.

And yet the functions of what we call our memory require a constant changing of the elements of the nervous system. The question of memory and learning and mental development is a very difficult and complicated one, which includes a number of different fields of investigation. We enter here upon the domain of psychiatry, of the higher consciousness, of the central and peripheral consciousness, of the subconscious mind; in short, upon the domain of the mind and of all these conceptions and terms in which the things of the mind are discussed. There is just now only a very vague and remote connexion between these conceptions and the terminology of psychiatry and the anatomical facts of neurology. The reflex theory of Sherrington, laid down in his masterly work on the integrative action of the central nervous system, based upon the fundamental principles of neurology and reflex action of Hughlings Jackson and Mott, the anatomical conceptions of the "horme" and "mneme" of Monakow, the anatomical facts and descriptions of Kinnier Wilson, of Nissl, of Winkler, of Magnus, have been pushed into the background by the psycho-analysis of Freud and the phenomenology of Jaspers, and according to the newer psychiatry the pathology of the mind seems to depart farther and farther from the anatomical basis, built during fifty years by the incredible labour and energy of a host of neurologists. Even the biochemist of the future, according to Mathews, has to be more than an electrical engineer; he must be a poet and a psychologist as well.

Even when we fully acknowledge the truth of what the phenomenologists say: that neurology has not yet been able to give us a sound and solid basis of anatomical facts upon which to build conceptions of mind and memory, there is no need to leave this solid ground. Material changes in the histology of the nerve-cells must be responsible for the permanent changes in mind and its behaviour towards the world. But these changes will, of course, be found only in the most intimate and delicate structure of the protoplasm of the cells, and will leave the general form and constancy intact. In the first place, while the cells as physiological units remain independent of each other, delicate threads, growing out from the neurite processes, travel through the glial tissue, reach other cells, and become connected with these by extremely delicate endings—the synapses of Sherrington. In this way new connexions are formed between the different cells, new paths along which the nervous stimuli may pass from one cell to another. Already existing threads may branch and thus reach new cells, and it is clear that in this way, while the cells remain unaltered, their form does not change, and the structure of the whole keeps its character, there arise new possibilities of stimulation and association by which the mental activity is enlarged and new associative properties are created.

The only difficulty lies in the assumption that these association fibrillæ grow out actively and independently as new collateral threads. For immediately the question arises: by what influence are these delicate fibrillæ, lost in the dense thicket of glial fibres and other nerve-cell processes, guided to the nerve-cell with which they establish a new connexion? Many investigators (Monakow, Nissl, Held) have supposed that they do not grow out independently, but that there exists throughout the nervous system a sort of fundamental network of living substance, exceedingly delicate, which unites all the nervous elements in a syncytial mass, and in which new paths for the conduction of the nervous stimuli may be differentiated. Others, however, conceive the outgrowth as an independent cell process growing out from the cell and reaching the other cell, guided by glial tissue cells and by extremely weak electric currents (or neurobiotactic influences, as Kappers supposes), but remaining an independent thread from beginning to end, because in their preparations they do not see anything which might be interpreted as the morphological substratum of these influences. Here we need only state that these outgrowing threads are formed and that by them new associations may be built up.

In the second place, the conducting apparatus of the cells themselves may be altered, and the existing connexions between different cells change their structure, thus causing the stimuli to pass more easily and quickly along one path than along another. Here we enter upon the much-debated and still debatable domain of the internal structure of the nerve-cells and its bearing on the problem of the conduction of the nerve impulses and the generation of new impulses. The nerve-cells may be connected with each other by their cell processes. Such a cell process may end in a sort of ramification which envelops the protoplasmic body of the nerve-cell with which it is connected. In certain cells these ramifications may be coarse and form a calyx-like investment to the cell body; in other places the pericellular fibres of the terminal ramification are very delicate and form a fine arborisation. Where these fibrils come into contact with the surface of the cell, they may end in small button-like enlargements or varicosities. In all cases we say that the nerve-cells are linked together by a synapse. Although the physiological changes—the nerve impulses—are propagated, stepping over, as it were, from one cell to the other at each synapse, there is evidence that in the transmission of nerve impulses from one cell to another a block always occurs at the synapse, causing a slight arrest or delay in transmission, and that nerve-impulses pass the synapse in one direction only. Apparently the nerve impulse is changed in passing from one cell to another. Is this change permanent and unalterable?

Those morphologists who regard the nerve-cells as independent units usually regard these synaptic connexions as consisting of dead matter, a sort of cement substance gluing the terminal buds or ramifications to the surface of the cells with which the endings of the nerve processes are in contact, or as a sort of transverse membrane across the conducting structures, which are then regarded as more fluid (Sherrington). No alterations in this dead matter seem to be possible, and the conducting substance of the afferent cell processes would be entirely separated from the conducting substance of the nerve-cells to which they are glued. Now this would be very difficult to understand. It seems impossible to conceive a stimulus passing from one nervous element to another through a non-living membrane or a cement substance without disintegrating. There must be living substance between. Even the hypothetical synaptic membrane of Sherrington must be an arrangement of units of the living substance. This living substance must be able to transmit the nervous stimuli. Now, as far as we know at present, the histological evidence tends more and more towards regarding, as the real conducting apparatus of the nervous elements, the exceedingly delicate fibrillæ inside the protoplasm of the nerve-cells and their cell processes. These neurofibrillæ are found throughout the whole nervous system everywhere where nervous impulses are conducted in a definite direction. In the peripheral junctions, where the impulse has to be transmitted to a muscle-fibre or a sensory impulse has to be transmitted from a tactile cell to the sensory nerve-fibre, we find an intermediate structure, a very delicate protoplasmic network, connecting the neurofibrillar structure with the protoplasm of the end-organs (the muscle-fibre or the tactile cells). So in the peripheral junctions we find a real protoplasmic connexion between the two, with a structure enabling it to transmit the nervous stimulus.

When we regard the connexion between the nerve-cells in the central nervous system—the synapse—as consisting

of living substance in and through which the nervous stimulus may be transmitted, we must make clear both the possible mode of transmission of this stimulus and also the physiological independence of the nerve-cells and the anatomical nature of the synapse as a secondary connexion differing in character from both the connected parts. The only way to do this is to regard the intervening substance of the synapse not as a sort of non-living cement but as a living substance, in which there is a structure akin to the intermediate substance of the peripheral junctions and which connects the neurofibrillary endings of the cell processes with the conducting apparatus of the nerve-cell itself. As a living substance the synapse may obtain such an arrangement of its living units composing the conducting protoplasmic apparatus as is more suitable for a quick and unweakened transmission of the stimulus. Inside its protoplasmic substance there may be formed a more complex organisation of its linear (neurofibrillar) structure, or a transient part of this linear structure may become fixed; in short, inside the synaptic living substance the conducting apparatus may become more and better organised. In this way it might be possible to explain those alterations of the transmission of nervous stimuli by which stimuli coming from particular cells are enabled to follow a particular path of transmission more quickly and easily than another path, and so to give rise to one distinct complex of reflex actions. This phenomenon—that a certain stimulus, unimportant in itself, gives rise to a distinct set of reflex actions, that in their turn may be the cause of other well-ordered actions and so regulate or alter our mental activity—creates what we call memory, our remembrance of things in the past that regulates and governs our existence, our life.

Thus, even in a permanent structure like the nervous system there is room for alteration, for growth, and for amelioration (and on the other hand for deterioration), within the boundaries of normal structure. By this is determined its intrinsic value for our health and existence.

Agduhr, who investigated the structure of the spinal cord and the nerve-roots, suggested that even the unalterability of the nervous system as a whole after birth may not be so absolute as is generally assumed. He subjected young dogs to a very severe and prolonged muscular training, and counted the nerve-cells and nerve-fibres belonging to the muscles which were thickened and strengthened by the training process. He found a distinct progressive alteration of the number of nerve-cells and fibres and concluded that, even in a nervous structure already formed, a branching of nerve-fibres and an increase of the number of nerve-cells is possible, at least in the much simpler structure of the spinal cord and spinal ganglia. Further investigation is necessary here, and indeed we are still on the threshold of this field of inquiry, but it may be sufficient to show that, even in the permanent structure of the nervous system, health is a process of movement and never of stagnation. It is only in this way that we can understand all those other phenomena of the nervous system, the phenomena of regeneration which in the higher animals are studied almost exclusively in the nervous system, the curious phenomena of the vicarious action of the different parts of this system after one part of it has been destroyed, the action of the glial elements in disease, and so many other problems of the nervous system in health and disease.

ILLUMINATION AND PRINT.

AT a meeting of the section of State Medicine of the Royal Academy of Medicine in Ireland held on Jan. 17th, the President, Prof. W. D. O'Kelly, urged the need for fixing school standards of adequate and correct illumination and not merely minima; he thought a foot-candle-meter should be used on a dull day and actual readings taken in the rooms. No child should be condemned to sit the whole year in a badly lighted place; pupils should be changed round during the day unless conditions were ideal. Artificial illumination was merely a stop-gap arrangement in existing buildings. Children under 12 should not be allowed to use school books with letters less than 1·75 mm. high, nor less than 1·5 mm. high at any time during school life. If it were necessary to economise he would prefer a page and type twice the size printed on a cheaper paper. One of the objections to the use of small type was that the ascending and descending parts of the letters were reduced more than the other portion. The eye picked out in reading the upper part rather than the whole letter, and as all the capitals were ascending letters and ascending lower case letters occurred more frequently than descending ones it was rendered doubly difficult for the child to read small type. When illumination was insufficient a great strain was thrown on the eye and damage frequently resulted.

The Irish type was, said Prof. O'Kelly, pleasing to the eye. Irish texts set up in roman type did not look so well, especially when "h" was substituted for the aspiration mark. He did not think the Irish type would be replaced by the Roman any more than the Venetian had replaced the English black letter, although the former was a simpler type. The Gothic varieties, although more difficult, were more pleasing. The print in school books in the Saorstat was good in the majority of those he had examined; it averaged 10–11 point. But he would prefer 12 point. If used in model by-laws why not in school books? In three of the seven grammars on the approved list the print was too small; in the exercises of one of these the small letters were only 2 mm. high. Dr. M. O'Leary, however, remarked that even in schools which conformed to the rules laid down by the Local Government Department the percentage of cases of bad vision was nearly as high as in those which did not; it had recently been stated that 50 per cent. of the eye troubles in children were hereditary and were not in any way due to faulty illumination in the schools.

CICELY NORTHCOTE TRUST.

THE social service department at St. Thomas's Hospital, founded in memory of his sister, by the late Mr. H. S. Northcote, publishes its twentieth report this year. The Fathers' and Mothers' Club, which provides classes on all kinds of home-making for mothers—while their children are tended for them in another room—and debates and social evenings for fathers after working hours, is as popular as ever with the parents who own it, but is sadly in need of money to enlarge its space. Nearly 9000 patients have been visited in the wards by Northcote Trust workers, who try to establish what the Americans call a "100 per cent. contact," so as to smooth the path for them from the warm shelter of the wards to the stark realities of life at home. Where necessary, the ward visits are followed up by home visits, and any kind of assistance is given, varying from the provision of an ambulance to all arrangements for convalescent treatment and the care of the family while the patient is away. The Northcote Trust almoner is responsible for arranging the supply of insulin to diabetics who have been discharged from hospital. She has to decide whether it can be obtained through a panel doctor or through hospital at a reduced price, or, if not, how the patient can meet the demand on his purse. Another group of patients over whom the Trust watches with especial care are the cancer cases. All patients discharged with cancer are visited at regular intervals to make sure that they are not in want, and that they have the necessary dressings, diet, and nursing comforts. During last year, for instance, four wheeled-chairs were given to cancer patients, over 1200 of whom were watched. The Northcote Trust Hostel admits unmarried mothers and pregnant girls who need treatment, and tries to give both mother and baby as good a start in life as possible. Thanks largely to the influence of America, social service has come to be recognised as one of the most important aspects of a hospital's work. The pioneer efforts of the Cicely Northcote Trust have been appropriately recognised this year by a request from Australia for a visit from the head worker, Miss Macintyre, to inaugurate a centre of work and training at the Melbourne Hospital. We hope it will not be long before every hospital in this country considers itself inadequately equipped unless it has a social service as efficient and as devoted as that at St. Thomas's Hospital.

A DOCTOR IN A NOVEL.

ON Oct. 18th, 1929, Dr. Luke Serocold, one of a firm of three practitioners who shared the work of a small country town with one rival, paid six professional visits to private patients; attended a meeting of the Town Council as Medical Officer of Health (part-time); and performed a radical mastoid operation. At 2.30 A.M. he was watching the death of his senior partner; at 11.45 P.M. he was giving the anæsthetic while his assistant delivered a child.

Dr. Serocold, it must be admitted, is only a character in fiction created by Miss Helen Ashton, whose novel centreing round his day's work, has just been published.[1] But he will be recognised as a typical family doctor, who has reached an age when he is even more interested in the struggles of his patients to adapt themselves to their environment, than in their physical disorders. We see their problems through his kindly eyes, mourn with him for his doomed friend, and rejoice in the brave indiscretion that costs him his best patient. Some readers of the book might have preferred to observe the behaviour of the neighbours and patients and to draw conclusions about their emotional life, instead of only seeing them reflected in the doctor's musings. The majority, however, will be content to follow Dr. Serocold through his day's work with the respectful attention he deserves, rejecting the suspicion that in real life he might have been a bore. Since women doctors in fiction are often incredible, a word of praise is due to Miss Ashton for her sketch of Dr. Jean Gordon, a young assistant of pleasant demeanour, who is competent without taking herself too seriously.

[1] Dr. Serocold. By Helen Ashton. London: Ernest Benn, Ltd. 1930. Pp. 288. 7s. 6d.